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Phytogeographical explorations in the coastal plain of Georgia in 1904

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In 1904 my field work was confined to the winter and spring months, in which I had not previously done any work in South Georgia. While collecting timber specimens for the Georgia State Museum I spent a month, from January 23 to February 23 inclusive, in the coastal plain, passing through the counties of Muscogee, Chattahoochee, Marion, Schley and Sumter in January, and Dooly, Wilcox, Irwin, Coffee, Appling, Ware, Clinch, Echols, Lowndes, Brooks, Thomas, Decatur, Miller, Early, Calhoun and Randolph in February. During this period flowering plants numbered *2039* to *2056* and about the same number of fungi and bryophytes were collected. At the same time I made many car-window notes on distribution, mainly of trees and evergreen shrubs.

After completing my work for the State I took the field again on March 25, and before the end of May made notes or collections in the following counties lying wholly or partly in the coastal plain: McDuffie, Columbia, Richmond, Burke, Screven, Bulloch, Emanuel, Jefferson, Washington, Wilkinson, Baldwin, Jones, Bibb, Houston, Twiggs, Laurens, Montgomery, Tattnall, Bryan, Chatham, Liberty, McIntosh, Glynn, Wayne, Pierce, Ware, Coffee, Berrien, Lowndes, Irwin, Wilcox, Dooly, Sumter, Webster, Stewart and Randolph, approximately in the order named. On this trip vascular plants numbered *2057* to *2080* were collected in March, *2081* to *2181* in April, and *2182* to *2232* in May. Seventeen numbers of mosses and thallophytes were collected at the same time.

[The BULLETIN for August (**32**: 397–449, *pl. 22*) was issued 28 Au 1905.]

On both trips, winter and spring together, I traveled about 2500 miles by rail * through the coastal plain, in order to examine as much of the region as possible in its vernal and prevernal aspects. At the same time about 250 photographs of coastal plain vegetation and scenery were taken, with three cameras.

The winter of 1903–4 was colder than usual in Georgia, and spring was consequently late. The first spring flower I noticed was *Alnus rugosa*, on January 23. *Acer rubrum* began to bloom in Coffee County about the first week in February, and *Pieris phillyreaefolia*, *Thyrsanthema semifloscularе* and an unidentified species of *Crataegus* in Lowndes County before the middle of the month. On the Chattahoochee River in Early County *Acer saccharinum* and two or three species of *Ulmus* were just past flowering on February 18, and *Luzula saltuensis* † was beginning to bloom in Randolph County on the 23d. But after April 1st there was no noticeable scarcity of flowers. On that date I found a *Utricularia*, a *Myriophyllum* and a *Potamogeton*, plants which one usually associates with summer, in bloom in Screven County. During the first month after the vernal equinox, before the leaves on the trees were full-grown, I spent most of the time in the Eocene region of the coastal plain, where mesophytic forests prevail (*e. g.*, in the counties of Richmond, Burke, Jefferson, Washington, Wilkinson, Twiggs and Houston), and the woods at that season were resplendent with *Aesculus Pavia*, *Cornus florida*, *Azalea nudiflora* and other characteristic spring-flowering trees and shrubs, much as in the Piedmont region (Middle Georgia) a little farther inland.

Toward the end of April I passed into and through the pine-barren region,‡ where shade and shade-loving plants are scarce, and the most conspicuous flowers do not appear until summer. On a visit to Tybee Island at the mouth of the Savannah River on April 30 I was rather surprised at the scarcity of flowers.

* For over 600 miles of this I am indebted to the courtesy of the officials of five railroads, the Georgia, the Louisville & Wadley, the Macon, Dublin & Savannah, the Wadley & Mt. Vernon Extension, and the Georgia Southern & Florida, especially the last named.

† See Bull. Torrey Club **32**: 154. 1905.

‡ In Georgia the Cretaceous and Eocene regions together constitute about one-fourth of the area of the coastal plain, and the pine-barrens nearly three-fourths.

There seemed to be none at all in the salt marshes, and on the dunes only *Oenothera humifusa*, a *Cakile* and a *Gnaphalium* were noticed in bloom. But in the "hammocks" (low sandy elevations in the salt marshes, covered with evergreen trees and shrubs) *Helianthemum corymbosum* and *Opuntia vulgaris* were in bloom and a *Juncus* and a *Sagina* had already discharged their seeds. On McQueen Island, a brackish marsh eight miles long, midway between Savannah and Tybee, the only flowers visible from the train were those of *Scirpus Olneyi*, a *Hymenocallis* and an *Iris*, and these only at the upper end of the island (where I got off on the way back and collected them).

Most of the places of interest visited in 1904 would have little significance for persons not familiar with coastal plain geography in general and that of Georgia in particular, but there are at least two localities which deserve mention here.

In the southeastern part of Houston County, particularly for two miles north of Grovania and about the same distance south of Elko, much of the surface is strewn with siliceous boulders, and as the topography is at the same time quite rugged, such land is ill adapted for agricultural purposes and still retains its primeval forests. These forests are typically mesophytic, as is usually the case in the upper fourth of the coastal plain, but the abundance of rocks gives them a much more decided Middle Georgia aspect than in most coastal plain forests. I passed through this rocky region on the 15th and 16th of April, about the time flowers are most numerous in such places, and was interested to see such species as *Botrychium virginianum*, *Phegopteris hexagonoptera*, *Stipa avenacea*, *Melica mutica*, *Arisaema triphyllum*, *Luzula campestris*, *Erythronium americanum*, *Vagnera racemosa*, *Uvularia perfoliata*, *Salomonia biflora*, *Medeola virginica*, *Trillium Hugeri*, *T. stylosum*, *Juglans nigra*, *Hicoria ovata*, *Quercus rubra*, *Hepatica triloba*, *Sanguinaria canadensis*, *Geranium maculatum*, *Nyssa sylvatica*, *Oxypolis rigidior*, *Asclepias variegata* and *Chrysogonum virginianum*, none of which range much farther south, while they are more frequent in Middle Georgia or farther north. But the coastal plain character of this region is unmistakably shown by the occurrence, in the same forests, of *Pinus glabra*, *Tillandsia usneoides*, *Uvularia floridana*, *Smilax pumila*, *Myrica carolinensis*, *Magnolia*

grandiflora, *Acer floridanum*, *Leucothoë racemosa* and *Mesadenia ovata*.

The extent of this formation east and west is unknown, but I have not heard of the occurrence of anything of the kind in any other county. The age of the formation is not definitely known either, but is doubtless either Eocene or Oligocene.

Immediately north of the northernmost of these rocky areas, and perhaps also between them, is a region with strongly calcareous soil and outcrops of soft limestone, characterized by some or

FIGURE 1. View in the rocky woods about a mile south of Elko, Houston County, April 16. Topography and vegetation rather exceptional for the coastal plain. *Polystichum acrostichoides*, *Hicoria glabra*, *Fagus americana*, *Nyssa sylvatica* and *Cornus florida* appear in the view, and the whole aspect of the place is much like that of many points in the Alleghanies and farther north.

all of the following plants: *Taxodium distichum*, *Carex cherokeensis*, *Rhapidophyllum Hystrix*, *Arisaema Dracontium*, *Tillandsia usneoides*, *Trillium lanceolatum*, *Zephyranthes Atamasco*, *Juglans nigra*, *Hicoria ovata*, *Quercus hybrida*, *Q. acuminata*, *Morus rubra*, *Ulmus fulva*, *Crataegus* (several species), *Prunus americana*, *Cercis canadensis*, *Geranium maculatum*, *Ptelea trifoliata*, *Rhamnus caroliniana*, *Viola multicaulis*, *Bumelia lycioides*, *Spigelia marilandica*, and *Phlox divaricata*.

This limestone formation seems to form a narrow belt extending from the vicinity of Sandersville through or near Beech Hill, Danville, Westlake,* and Tivola, to Perry and perhaps Marshallville. Some people living near it have an idea that it extends from North Carolina to Mexico, but this is certainly an exaggeration. In Houston County it is commonly known as "the limestone ridge," and is dreaded by farmers who have to haul loads across it in wet

FIGURE 2. Swamp of Oconee River near Beech Hill, Wilkinson County, a point in the limestone belt here described. April 13. The trees are all deciduous, *Quercus Michauxii* being probably the most abundant. The Palmettos are *Sabal Adansonii* and *Rhapidophyllum Hystrix*, the former predominating. *Carex cherokeensis* and other species cover the ground. Shrubs are almost wanting.

weather. At other points where I have crossed it it is characterized by many of the same plants just mentioned, and may be traced by means of them in places where outcrops of the rock are wanting, as in the swamps of the Oconee and Ocmulgee rivers. (See FIGURE 2.) The limestone belt is approximately parallel with the inland edge of the pine-barrens, from which it is distant about ten miles. It is believed to be of Upper Eocene or Lower Oligocene age, but its stratigraphic relations with rocks of the same age else-

* See Bull. Torrey Club **32**: 162. 1905; under *Crataegus georgiana*.

where, and with the siliceous rocks just mentioned, are as yet very uncertain.

In Stewart County there is a remarkable area of genuine pine-barrens, which I first noticed in 1901,* and examined more carefully in the latter part of May, 1904. It is situated immediately south of Omaha, on a plateau which is bounded abruptly on the north by Hannahatchee Creek, and on the west by the Chattahoochee River bottoms, and is elevated something like 100 feet above both streams. The southern and eastern limits of the plateau have not been ascertained, but the pine-barrens occupy at least a square mile in the northwestern corner of it. What makes this pine-barren area remarkable is the fact that it is well within the Cretaceous region (having unmistakable exposures of Cretaceous rocks north, south, east and west of it) and is separated from the rest of the pine-barrens by the whole width of the Eocene and part of the Cretaceous, a distance of thirty or forty miles. Although *Pinus palustris*, the characteristic tree of the pine-barrens, is scattered more or less over the whole Cretaceous region of Georgia, yet nowhere else in that region have I seen it constituting the bulk of the forest as in the place here described. In the Eocene region it is still rarer, and one may go from Cuthbert twenty miles northward on the road to Lumpkin without seeing a single specimen of it, its place being taken there mostly by *P. echinata*.

The pine-barrens near Omaha are nearly level, and contain several ponds, at least one of which probably holds water all the year round. (See FIGURE 3.) The whole aspect of the place is much like that of some of the pine-barrens in the Lower Oligocene region (in Sumter County, for instance), and totally unlike that of the typical Cretaceous country, which is carved into broad valleys and rather narrow ridges, indicating a comparatively ancient topography. The long-leaf pines grow fully as large as they do anywhere, and I measured a stump of one which was 38 inches in diameter. The pines of low grounds are *P. serotina* and *P. Taeda*, instead of *P. Elliottii*, which ranges throughout the typical pine-barrens in similar situations. The following shrubs and herbs are common to this area and the typical pine-barrens, and are rare or wanting in the Eocene and the rest of the Cretaceous: *Anchistea vir-*

* See Bull. Torrey Club 30: 287, 325. 1903.

ginica, Scirpus cylindricus, Xyris Smalliana, Eriocaulon compressum, Pontederia cordata, Pogonia divaricata, Brasenia purpurea, Polygala lutea, Hypericum fasciculatum, H. acutifolium, Rhexia glabella, Persea pubescens, Proserpinaca pectinata, Limnanthemum aquaticum, Vaccinium nitidum, Gratiola pilosa, G. ramosa, Monniera caroliniana, Utricularia purpurea, Houstonia rotundifolia, Viburnum nitidum, Sclerolepis uniflora and *Scricocarpus bifoliatus.* Two of these, *Anchistea* and *Monniera*, are reported in Mohr's Plant Life of Ala-

FIGURE 3. "Alligator Pond," in the outlying pine-barrens near Omaha. May 24. The tree in the left foreground is *Pinus serotina*, and most of those in the distance are of the same species. *Pontederia cordata* conspicuous in the foreground. (For a list of some other species observed in the same pond, see Bull. Torrey Club **30**: 325. 1903.) The demarcation between the pond vegetation and the surrounding shrubbery is much more abrupt here than in typical pine-barren ponds, and suggests the glacial lakes of the northern states.

bama as having been collected by Dr. E. A. Smith in the neighboring counties of Russell and Barbour in Alabama.

Now as for the cause of these outlying pine-barrens. The two superficial formations, Lafayette and Columbia, are present, as in the typical pine-barrens and most other parts of the coastal plain, but these rarely if ever determine the topography. The conclusion is irresistible that we have here between the Lafayette and Cretaceous strata an outlying patch of some Tertiary formation. Dr.

Smith suggests that it may be the Grand Gulf, which he finds to overlap a good deal of the Cretaceous and Eocene in Alabama; but the topography is not exactly that of the Altamaha Grit, which in Georgia corresponds to the Grand Gulf formation in Alabama and westward. Future explorations will probably settle this point.

The following plants of special interest were observed in South Georgia in 1904:

PELLAEA ATROPURPUREA (L.) Link

Collected on May 26 on limestone boulders in rich woods in the extreme northern part of Randolph County, about a mile from Grier's Cave (no. 2231), making one more species common to Pigeon Mountain in Northwest Georgia and the Midway Eocene region of Randolph County.* The general aspect of its surroundings is much the same at both places. No other coastal plain station for *Pellaea* seems to be known.

?SPARTINA JUNCIFORMIS Engelm. & Gray

On May 3, while approaching Brunswick, I saw from the train just outside of the city a quantity of an unfamiliar grass, and on investigating the next day I found it to be a *Spartina* (*no. 2187*), with slender erect stems 5 or 6 feet tall, growing in dense tufts of several hundred each. Its inflorescence is most like that of *S. juncifórmis*, a species of the Gulf coast, but it can hardly be that or any other described species. The leaves of my plant are concave, but not involute when fresh; and there is nothing in the existing descriptions of *S. juncifórmis* to indicate that it grows in such large tufts. (But probably most of these descriptions are drawn entirely from herbarium specimens, as is too often the case.) The habitat of my plant was very unusual for a *Spartina*, being a sort of combination of cypress (*Taxodium imbricarium*) pond and pine-barren stream, though probably only a few feet above tide-water. All the specimens seen were within about a hundred yards of each other.

SCIRPUS FONTINALIS Harper, Bull. Torrey Club **30**: 322. 1903

This species, previously known only from the type-locality in Sumter County, has turned up at two more South Georgia

*See Bull. Torrey Club **31**: 16. 1904.

stations, quite different from the type-locality as well as from each other. On April 16, I found a few specimens beginning to flower (*no. 2130*), around a spring in the rocky woods mentioned above, about two miles south of Elko in Houston County. On May 3, I collected it again in low woods near Thalmann, Glynn County, where it was more abundant (*no. 2185*). Here it was associated with *Sabal Palmetto*, *S. Adansonii*, *Cladium effusum*, *Itea virginica*, *Rubus nigrobaccus*, *Acer rubrum*, *Pieris nitida*, *Viburnum nudum*, and some other species which seemed strangely incongruous; while at the Houston County station some of its nearest neighbors were *Hepatica*, *Sanguinaria*, *Geranium*, and other familiar northern plants. The three known localities have probably at least one feature in common however, the absence of the Lafayette formation and consequently more or less calcareous soil.

The specimens of these later collections have culms ascending or nearly erect (not nodding as in the type), and shorter and less densely tufted than in the original specimens; no tendency to proliferation in the inflorescence was observed (though this may develop later in the season); and the type specimens were evidently somewhat abnormal in these respects. The new specimens seem to be just as distinct from related species as the old ones were.

CLADIUM MARISCOIDES (Muhl.) Torr.

This is probably common enough in the glaciated region of the North, but very few stations are known for it in the South.* Consequently I was rather surprised to find a good deal of it in a grassy cypress pond between Pinehurst and Unadilla in Dooly County on May 21 (*no. 2221*). It was then not quite in flower.

The leaves of this species are different from any others known to me, and I have never seen them correctly described. Toward the base they are channeled, and a cross section there would show a shallow trough with flat bottom and erect sides. Tapering upward, the leaf gradually folds inward on its midrib, and within an inch or so of the apex the margins (remaining about the same width) become completely united, giving there a triangular cross section.

* See Rhodora 1: 43, 98, 204; 2: 123, 202; 5: 133; 6: 108; 7: 72; also Mohr, Contr. U. S. Nat. Herb. 6: 410. 1901

CAREX SQUARROSA L.

A few specimens were collected in the swamp of the Ocmulgee River at Barrow's Bluff (the present northern terminus of the Wadley and Mt. Vernon Extension R. R.), Coffee County, on May 14 (*no. 2204*). Its occurrence there is rather anomalous, for it had not previously been reported south of the mountains of Georgia; but it is unquestionably indigenous.

CAREX WALTERIANA Bailey (*C. striata* Michx.)

With *Cladium mariscoides* (see above), also in pine-barren ponds in Screven (*no. 2090*) and Irwin counties in the Altamaha Grit region. Seen in 1903 in the eastern part of Effingham County (*no. 1810*). Not at all common.

The perigynia of this species are described in Small's Flora, and perhaps elsewhere, as "purple-brown," but they are really pale-green, just as in most species with inflated perigynia.

CAREX sp.

On May 4, I collected in a cypress pond just outside of Brunswick some over-ripe specimens of a *Carex* (*no. 2186*) which does not seem to be provided for in modern books. I at once recognized it as a species I had often before seen in summer after its fruit had all fallen, and had never collected for that reason. I afterward saw it in a number of similar places in the pine-barren region. It is so common that it must have been seen by many botanists in the past, and it has probably been described, but it is practically impossible to decide what name, if any, should apply to it. I will describe it briefly here so that future monographers may recognize it and perhaps place it correctly. It is a near relative of *C. glaucescens* Ell. or *C. verrucosa* Muhl. (if these are synonymous; if they are not, it may be identical with one of them), but differs from the plants to which these names have been usually applied in having the pistillate spikes on stout nearly erect peduncles, and flowering always about three months earlier (*i. e.*, in March or April, like most *Carices* in that latitude).

CAREX CHEROKEENSIS Schw.

Seen on April 13 and 15 at two points in the limestone belt above mentioned, namely, in the Oconee River swamp near Beech

Hill, Wilkinson County (*no. 2116*), and in rich woods between Tivola and Beech Haven, Houston County. At the former station (see FIGURE 2) it and several of its congeners were quite abundant. This is one of the few *Carices* which shows a decided preference for calcareous soil. It does not seem to have been reported from the coastal plain of Georgia before (though I collected it in Sumter County in 1900), but it has long been known from the Palaeozoic region (Northwest Georgia), where it seems to have been first discovered.

In the description of the species in Small's Flora the word staminate is inadvertently used instead of pistillate, and in the key the descriptive phrase "Leaves pubescent" belongs to the northern representative of the group *Flexiles* (see Britton's Manual, page 206), and not to *C. cherokeensis*. This gave me some trouble in identifying it. The following characters might well be added to the existing descriptions of this very distinct species: — Rootstocks stout, elongated, horizontal, partly covered with the rigid persistent bases of the leaves; leaves smooth and shining, tough, purple at base.

CAREX RENIFORMIS (Bailey) Small

With or near several of its congeners (but perfectly distinct from any of them) in the swamp of the Ohoopee river near the center of Tattnall County, April 26 (*no. 2153*). Previously known only from Mississippi and Louisiana.

ERIOCAULON LINEARE Small, Fl. S. E. U. S. 236. 1903

This was one of the greatest surprises of the whole trip. It was originally described from a few specimens collected in wet woods in the pine-barrens in the upper part of Bulloch County in June, 1901; and I never saw a trace of it again until April and May of last year. Then I was astonished to find it one of the most abundant plants in moist pine-barrens in the Altamaha Grit region, growing in countless millions in Bulloch, Tattnall, Montgomery (*no. 2146*), Coffee, Wilcox, Irwin, Berrien, and doubtless many other counties. Its habitat is exactly that of the well known and larger *E. decangulare*, which is equally abundant and conspicuous during the summer months. *E. lineare* seems to flower only in April and May (the type specimens, collected early in June, were

past their prime), and after that its scapes must disappear almost completely, and the leaves alone would attract no attention. When it is in flower *E. decangulare* can usually be found with it, but very immature and inconspicuous, and when the latter blooms the former is almost invisible. How such an abundant species as *E. lineare* could have been overlooked so long can be explained only on the supposition that it is nearly confined to the Altamaha Grit region, which up to last year had scarcely been explored in spring.*

FIGURE 4. *Eriocaulon lineare* in moist pine-barrens, Douglas, Coffee County. May 16. Two months later in the season *E. decangulare* can be found equally abundant on the same spot. (The pitcher-plants are *Sarracenia flava* in the background and *S. flava* × *minor* in the foreground.)

If the plant had ever been seen by other botanists it was probably mistaken for *Lachnocaulon anceps* or *Dupatya flavidula*, which often grow with it and are about the same size. In its own genus it is probably nearest related to *E. compressum*, a considerably larger plant which flowers still earlier, in March and April, and grows almost always in pine-barren ponds. *E. septangulare* is nearer to it in size, but is rare in the South, growing on sandy margins of ponds and flowering in late summer.†

With more copious material at hand, the resemblance of *E.*

* See Bull. Torrey Club 32: 142. 1905.

† See Bull. Torrey Club 31: 14. 1904.

lineare to a plant from Sumter County (*no. 1395*) which I had distributed in my 1902 collection as *E. texense* Koern. * seemed very strong, so on May 21 I revisited that locality and collected some more specimens (*no. 2219*) on the same spot. These proved to be *E. lineare*, as I suspected; so *E. texense* seems to be known only from the original collection, after all.

I notice an unfortunate typographical error in the original description of *E. lineare*. At the end of the first line, "alternate" should be "attenuate" (referring, of course, to the apex of the leaf).

ALETRIS OBOVATA Nash; Small, Fl. S. E. U. S. 286. 22 Jl 1903
(Described more fully in Torreya **3**: 101, 102. 25 Jl 1903)

This is the common if not the only white-flowered *Aletris* in the Altamaha Grit region. In May I saw it in the counties of Ware, Coffee (*no. 2201*), Wilcox, Irwin and Berrien, in rather dry pine-barrens. It was previously known only from the type-locality in northeastern Florida.

Dr. Chapman describes the flowers of both *A. aurea* and *A. farinosa* as either white or yellow, but it is now pretty evident that his yellow *farinosa* was *A. lutea* Small,† and his white *aurea*, *A. obovata* Nash; so the description of these two newer species has considerably facilitated our understanding of the genus. Like *A. lutea*, which often grows with it, and blooms at the same time, *A. obovata* differs from *A. farinosa* in range and from *A. aurea* in time of flowering.

With *A. lutea* and *A. obovata* at the place where I collected the latter (near Douglas) were a few specimens intermediate in appearance, probably hybrids.

HYMENOCALLIS sp.

At the end of April a *Hymenocallis* (*no. 2179*) in full bloom was conspicuous in the brackish marshes at the upper end of McQueen Island in Chatham County, about five miles from Savannah by the Tybee Railroad. It had only one or two flowers, usually two, on each scape, and the leaves were only about 2 cm. wide. This plant seems to have been known to LeConte, Feay,

* See Bull. Torrey Club **31**: 20. 1904.

† See Bull. Torrey Club **32**: 154. 1905.

and some of their predecessors, but in the present state of the literature bearing on the genus it is difficult to decide whether it has ever received a tenable name. It is certainly distinct from a species which grows in shady swamps in the Lower Oligocene region and has broad leaves and three or four flowers, blooming in July; but there are probably not more than three species of *Hymenocallis* in the southeastern states outside of Florida, and one of them is very

FIGURE 5. *Hymenocallis* sp. in Seventeen Mile Creek, Coffee County. May 12. The creek was very nearly dry at the time, but water often covers this spot.

local, growing only along the fall-line. These three species are recognized in Mohr's Plant Life of Alabama, but it is not certain that they are correctly named there. The study of this genus is complicated by the fact that some species are said to produce more flowers in cultivation than in the wild state, and several of them were first described from cultivated specimens.

What seems to be exactly the same plant was seen in a creek swamp in Coffee County in May, and the illustration of it subjoined (FIGURE 5) may enable some future monographer to determine the species.

QUERCUS GEMINATA Small, Bull. Torrey Club **24**: 438. 1897

This has been known hitherto only as a shrub or small tree, ranging from Florida to Mississippi. While collecting timber specimens in the winter I had occasion to study the live-oaks on the sand-hills of the Altamaha Grit region, and found them to be all of this species. In Coffee County (*no. 2050*) it is sometimes thirty feet tall, with a trunk two feet in diameter, which when full grown is never erect, but ascending or curved.

Its distribution has not been well worked out yet, but it can probably be found in every county in the lower half of the coastal plain of Georgia. *Q. virginiana*, with which it was formerly confused, seems to be confined to the immediate vicinity of the coast and to the lime-sink region (which are just the regions where *Tillandsia usneoides* grows most luxuriantly). These two oaks are not as distinct as one might wish, however, and on Tybee Island I have seen specimens which might be referred about equally well to either.

CLAYTONIA VIRGINICA L.

In the swamp of the Oconee River near Beech Hill, Wilkinson County (see FIGURE 2), April 13 (*no. 2120*). This is the only place where I have seen it in the South. Its habitat is certainly very different there from what it is in New York City, where it is almost a weed.

SAGINA DECUMBENS SMITHII (Gray) Wats.

What seems to be this little-known plant was collected in a hammock (see page 453) on Tybee Island on April 30 (*no. 2175*). It was past flowering, but was readily distinguishable from *S. decumbens* by its almost simple, strictly erect, purple stems. It was previously known only from the coastal plain of New Jersey, and adjacent Pennsylvania.

There are a number of plants on the sea islands of Georgia,

growing in apparently perfectly natural places, whose indigeneity* is doubtful, and this is one of them.

MAGNOLIA ACUMINATA L.

Collected in rich woods at the extreme coastward edge of the Cretaceous region, about two miles northwest of Lumpkin, May 25 (*no. 2227*). I saw only one tree, but was informed by a native that there is a good deal of it in the vicinity, and that its wood is a favorite material for hoe-handles.

SAXIFRAGA VIRGINIENSIS Michx.

On sandstone rocks on a bluff along McBean Creek in the southeastern corner of Richmond County, March 26, in flower (*no. 2061*). This station is in the Eocene region, about twelve miles below the fall-line, and seems to be the only one known for this species in the coastal plain.

DIRCA PALUSTRIS L.

On the sandy bank of the Oconee River opposite Dublin, Laurens County April 20 (*no. 2136*). This locality was pretty well exposed to the sun, and is rather a remarkable one for a species which in New England prefers the coolest and shadiest places.

AESCULUS PARVIFLORA Walt.

In rich shady woods at two or three places between Lumpkin and Omaha, in Stewart County, in the Cretaceous region, May 24 and 25, with flower-buds very immature (*no. 2225*). I do not know of any other station in Georgia for it. The habitat and time of flowering given for this species by Chapman and Small seem to need some revision.

POLYCODIUM REVOLUTUM Greene, Pittonia **3**: 325. 1898

On the sand-hills of the Allapaha River in the northeastern part of Berrien County, May 5 (*no. 2191*). A shrub about 6 feet tall, copiously branched. Previously known only from the type-locality in Lake County, Florida. This species is not mentioned

* I do not find this word in the dictionaries, but it appears in the *Journal of Botany* for March, 1905 (page 90), if not elsewhere, and there seems to be no other word to express the same idea.

in Small's Flora, but seems as distinct as any of those into which this little genus has recently been divided.

LEPTOPODA HELENIUM Nutt. Gen. **2**: 174. 1818

Frequent in moist pine-barrens and shallow ponds in various parts of the coastal plain, flowering in April and May. Collected in Bulloch (*no. 2167*) and Sumter (*no. 2213*) counties. This certainly seems generically distinct from *Helenium*, in which it has been placed by many authors; but I am unable so far to distinguish more than one species of *Leptopoda*.

COLLEGE POINT, NEW YORK.

The Polyporaceae of North America — XII. A synopsis of the white and bright-colored pileate species

William Alphonso Murrill

A synopsis of species with brown context was given in article XI of this series. The present paper deals with the genera and the principal described species having a white or bright-colored context and a distinct pileus. The species of certain genera are so numerous that they must form the subject of a separate article.

Subfamily 1. POLYPOREAE

It is not always possible to draw a distinct line of cleavage in this group. *Microporellus*, for example, has sessile forms which are thin and multizonate; *Funalia*, while usually brown, has some nearly white variations, and *Polyporus arcularius*, *Polyporus Polyporus* and *Polyporus caudicinus* have tubes very similar to those of *Hexagona*.

In distinguishing the subfamilies, also, certain species of *Fomes* are annual at times, while normally annual plants may assume a perennial appearance under favorable conditions. Poroid forms of *Agaricus* are always liable to confuse the beginner. The classification here adopted is acknowledged to be imperfect and artificial, but it is hoped that it will lead to something better when our knowledge of the plants treated is more complete.

Synopsis of the Polyporeae with white context

Hymenophore sessile.

- Tubes hexagonal, arranged in radiating rows; context thin. 1. *Hexagona*.
- Tubes alveolar; context thin, dry, surface zonate. 2. *Favolus*.
- Tubes mostly shallow, marginal and obsolete; hymenium hydnoid or irpiciform at a very early stage. 3. *Irpiciporus*.
- Tubes normally poroid, sometimes irpiciform from the rupture of the dissepiments at maturity.
  - Hymenium at length separating smoothly from the context. 4. *Piptoporus*.
  - Hymenium not separating as above.
    - Pileus very soft, spongy and elastic throughout.
      - Hymenophore of immense size; tubes small, fragile when dry. 5. *Dendrophagus*.
      - Hymenophore small; tubes large, not fragile. 6. *Spongiporus*.

Pileus more or less firm, flexible or rigid.
Context duplex, spongy above, firm below; surface sodden and bibulous. 7. *Spongipellis.*
Context not duplex as above.
Pileus fleshy-tough to woody and rigid; surface rarely zonate.
Surface anoderm.
Hymenium more or less smoke-colored at maturity. 8. *Bjerkandera.*
Hymenium white or pallid.
Context fleshy to fleshy-tough, friable when dry. 9. *Tyromyces.*
Context punky to corky, not friable when dry. 10. *Trametes.*
Surface pelliculose; plants chiefly tropical.
Plants small, 5 cm. or less in diameter. 11. *Rigidoporus.*
Plants large, more than 5 cm. in diameter.
Hymenium flesh-colored. 12. *Earliella.*
Hymenium white or pallid. 13. *Cubamyces.*
Pileus thin, leathery and more or less flexible; surface usually zonate.
Hymenophore preceded by a cup-shaped sterile body. 14. *Poronidulus.*
Hymenophore not as above.
Hymenophore normally pileate; tubes small and regular. 15. *Coriolus.*
Hymenophore semi-resupinate; tubes irregular. 16. *Coriolellus.*
Hymenophore stipitate.
Stipe compound. 17. *Grifola.*
Stipe simple.
Plants fleshy, terrestrial. 18. *Scutiger.*
Plants tough, epixylous.
Tubes large, hexagonal and radially elongated from the first. 1. *Hexagona.*
Tubes not as above.
Pileus inverted, erumpent from lenticels. 19. *Porodiscus.*
Pileus erect or lateral, not erumpent.
Context duplex, spongy above, woody below. 20. *Abortiporus.*
Context homogeneous, firm.
Surface zonate. 21. *Microporellus.*
Surface azonate. 22. *Polyporus.*

1. HEXAGONA Pollini, Pl. Nov. 35. *pl. 2, 3.* 1816

Type: *Hexagona Mori* Pollini.

Hymenophore small, annual, epixylous, flabelliform to reniform, rarely circular, stipitate, the stipe sometimes much reduced;

surface smooth or tessellated, margin thin; context thin, white, fibrous, fleshy to tough, usually fragile when dry; hymenium of radiating rows of large, thin-walled, hexagonal tubes, usually radially elongated; spores smooth, hyaline.

Species: *H. alveolaris* (DC.) Murr., *H. micropora* Murr., *H. daedalea* (Link) Murr., *H. Wilsonii* Murr., *H. hispidula* (B. & C.) Murr., *H. princeps* (B. & C.) Murr., *H. fragilis* Murr., *H. floridana* Murr., *H. tessellatula* Murr., *H. caperata* (Pat.) Murr., *H. brunneola* (B. & C.) Murr., *H. purpurascens* (B. & C.) Murr., *H. portoricensis* Murr., *H. hondurensis* Murr., *H. indurata* (Berk.) Murr., *H. cucullata* (Mont.) Murr., *H. Taxodii* Murr. [See Bull. Torrey Club **31**: 325–333. 1904.]

2. FAVOLUS Beauv. Fl. Owar. **1**: 1. *pl. 1.* 1805

Type: *Favolus hirtus* Beauv.

Scenidium Kuntze, Rev. Gen. 515. 1893. Type: *Favolus hirtus* Beauv.

Hymenophore small, annual, epixylous, sessile, dimidiate or reniform; surface multizonate, margin thin; context thin, leathery, pallid or brown; tubes alveolar; spores smooth, hyaline.

Species: *F. tenuis* (Hook.) Murr., *F. variegatus* (Berk.) Murr. [See Bull. Torrey Club **32**: 99–103. 1905.] The first species is usually white in substance, the other brown.

3. **Irpiciporus** gen. nov.

Type: *Irpex mollis* B. & C.

Hymenophore annual, epixylous, sessile, effused-reflexed, white or pallid throughout; surface anoderm, glabrous or velvety, not distinctly zonate, margin acute; context white, coriaceous or corky; hymenium hydnoid or irpiciform with traces of shallow obsolete tubes near the margin; spores smooth, hyaline.

Synopsis of the North American species

Teeth a centimeter or more in length; pileus often large and thick. *I. mollis.*
Teeth one-half a centimeter or less in length; pileus thin and shortly reflexed. *I. Tulipiferae.*

Irpiciporus mollis (B. & C.)

Irpex mollis B. & C. Hook. Jour. Bot. **1**: 236. 1849.
Irpex crassus B. & C. Hook. Jour. Bot. **1**: 236. 1849.

Described under the former name from Ravenel's collections in South Carolina and under the latter lower down on the same

page from plants collected by Curtis high up on the trunk of a living oak in North Carolina. The distinct zones on the context appear to accompany luxuriant growth, being present in very large plants known by Berkeley as *I. crassus*.

This species is often met with upon decaying wood of oak, locust, apple and various other deciduous trees throughout temperate North America.

New York, *Cook;* New Jersey, *Ellis;* Virginia, *Murrill;* Georgia, *Harper;* Florida, *Calkins, Lloyd;* Ohio, *Morgan;* Michigan, *Pieters*.

Irpiciporus Tulipiferae (Schw.)

Boletus Tulipiferae Schw. Syn. Fung. Car. 73. 1818.
Irpex Tulipiferae Fr. Epicr. 523. 1838.

Described from Schweinitz' Carolina collections on dead trunks of *Liriodendron*, as follows:

"B. P. maxima effusa margine involuto tenui albida, poris maximis acutis prominulis asperis irregularibus."

This species is considered by many the same as *I. sinuosus* Fr. (Elench. Fung. 145. 1828), described from specimens observed for several years on fallen oak branches in Sweden and others sent from Ruthenia by Weinmann. Bresadola goes further and adds *I. lacteus* Fr., *I. canescens* Fr. and *I. Bresadolae* Schulz. to the list of synonyms. In any case, Schweinitz' name is the oldest.

This is one of the commonest fungi in our woods, the thin effused pilei often extending the whole length of branches, and even entire trunks, of dead deciduous trees of all kinds. A few collections are as follows:

Canada, *Macoun;* New York, *Peck, Shear, Britton;* Pennsylvania, *Sumstine, Murrill;* New Jersey, *Ellis, Britton, Murrill;* Virginia, *Murrill;* Tennessee, *Murrill;* Ohio, *Selby, Morgan;* Missouri, *Demetrio;* Kansas, *Bartholomew;* Wisconsin, *Baker;* Mexico, *Egeling*.

SPECIES INQUIRENDAE

IRPEX PALLESCENS Fr. Epicr. 522. 1838. Described from plants collected by Schweinitz in North America on trunks of *Liriodendron*.

4. PIPTOPORUS Karst. Rev. Myc. 3[9]: 17. 1881

Type: *Boletus betulinus* Bull.

Hymenophore annual, epixylous, umbonate-sessile; surface smooth, azonate, pelliculose; context white, fleshy-tough; hymenium at length separating smoothly from the context, tubes white, thick-walled; spores smooth, cylindrical, hyaline.

Species: *P. suberosus* (L.) Murr. [See Bull. Torrey Club **30**: 424, 425. 1903.]

5. **Dendrophagus** gen. nov.

Type: *Polyporus Colossus* Fr.

Hymenophore very large, but of light weight, annual, epixylous, sessile, dimidiate, thick and pulvinate; surface pelliculose, glabrous, azonate, margin very obtuse; context very thick, soft and spongy throughout; tubes small, dark-colored, thin-walled, fragile; spores smooth, hyaline.

Dendrophagus Colossus (Fr.)

Polyporus Colossus Fr. Nov. Symb. 56. 1851.

Described from material collected by Oersted on stumps of *Cedrela odorata* at Puntarena in Costa Rica as follows:

"Pileo floccoso-suberoso molli crasso pulvinato, *margine tumido obtusissimo*, primitus cuticula tenella laevi vernicea sulfurea tecto, eaque secedente scabroso, contextu stuppeo mollissimo alutaceo-pallescente, poris minutis elongatis mollibus, intus fuscescentibus."

"Portentum mirabile et magnitudine et ponderis levitate. Fungus dimidiatus, sessilis, reniformis sed undulatus, crassimus (3–4 unc.) etiam in margine obtusissimo, contextu stuppeo-fomentario (nullo modo fibroso ut in Spongiosis), mollissima, alutaceo-pallida l. isabellina. Pileus extus quoque mollissimus, ut digito pressus foveas relinquat persistentes, undulatus, more *P. betulini* tectus cuticula laevi vernicea arcte adnata citrina, et in hoc statu pileus politus apparet, at cuticula secedente scabrosus evadit et decolorans. Pori valde longi et densi, absque trama discolori et a pileo separabiles, ore minuto, exsiccati nigrescentes, intus fuscescentes; in vivo enim admodum molles et hinc in exsiccatis confluunt in callum nigricantem absque poris extus conspicuis. Ad truncos ins. *San Jan* Indiae occid. lectus est fungus aeque giganteus, textura eadem, modo obscurior et pondere gravior; sed pileus epelliculosus, scabrosus, nigrescens. Pro forma prioris exoleta habeo."

Plants collected by Millspaugh, *no. 57838*, in Yucatan, appear to be immature specimens of the above species. Oersted's original plants are still preserved at Upsala. Further tropical exploration will doubtless discover more of this remarkable species.

6. **Spongiporus** gen. nov.

Type: *Polyporus leucospongia* Cooke & Hark.

Hymenophore small, annual, epixylous, sessile, dimidiate, pulvinate; surface white, anoderm to subpelliculose, azonate, soft and elastic; context white, extremely soft and spongy throughout; hymenium rigid, somewhat discolored, tubes large, irregular, thin-walled, lacerate; spores smooth, hyaline.

Spongiporus leucospongia (Cooke & Hark.)

Polyporus leucospongia Cooke & Hark. Grevillea **11**: 106. 1883.

This species was described from plants collected by Harkness at an altitude of 2,400 meters in the Sierra Nevada Mts., California, in 1882, growing upon decaying pine and spruce logs. Plants sent to Ellis under the name of *P. labyrinthicus* Schw. were forwarded to Cooke, who said they were clearly not *P. labyrinthicus* and suggested that they be described as new under the name of *Polyporus leucospongia*, an eminently appropriate name, since the whole pileus is pure white and as soft as a delicate sponge when young. Specimens have since been several times collected in Colorado by Bethel at about 3,600 meters on coniferous logs projecting from the snow. In such localities, he says, the plant is common, covering the ends of all such projecting logs. Crandall has also found it in Colorado and Nelson in Wyoming.

In Saccardo's Sylloge this species is queerly mixed with *P. labyrinthicus*, an error which clearly originated at Kew, for the sheet containing specimens of *P. labyrinthicus* labeled "U. S., C. B. Plowright" contains also at the bottom two packets of *P. leucospongia* from Harkness, *no. 1012*, collected in California on *Pinus contorta* and sent, as we know, under the name of *P. labyrinthicus*.

7. SPONGIPELLIS Pat. Hymén. Europ. 140. 1887

Type: *Spongipellis spumeus* (Sow.) Pat.

Postia Karst. Rev. Myc. **3**: 17. 1881. (Not *Postia* Boiss. & Blanch. 1875.) Type: *Polyporus borealis* Fr.

Hymenophore annual, epixylous, sessile, dimidiate, simple or imbricate, rather large; surface white, anoderm, sodden and bibulous; context white, duplex, spongy above, firm below; hymenium concolorous, tubes thin-walled; spores smooth, hyaline.

Synopsis of the North American species

Context coarsely fibrous; tubes medium; plant common on coniferous wood. *S. borealis.*

Context finer; tubes smaller; plant found on deciduous wood. *S. galactinus.*

SPONGIPELLIS BOREALIS (Fr.) Pat. Tax. Hymén. 84. 1900

Polyporus borealis Fr. Syst. Myc. **1**: 366. 1821.

Described from material collected on trunks of *Abies* in the mountains of Smoland as follows:

"P. albus, pileis fibroso-suberosis mollibus subvillosis, demum subfulventibus, poris tenuibus inaequalibus.

"Recens inodorus, siccus odorem aniseum debilem spargit. Imbricatus, subconcrescens, 2 unc. & ultra latus & crassus, superne convexus, nunc velutinus, nunc strigosus, margine acuto, subtus planus. Pori albi, lacerati, sinuoso & subrotundi, angustissimi, tubulos longos formant."

In the Elenchus, Fries separates two varieties, *montanus* and *spathulatus*, and notes that the species is extremely abundant on fir trunks in the mountains of Omberg.

This plant, although well known in Europe and fairly common in the northern parts of America, is still very imperfectly known by many of the botanists and most of the collectors in this country. It occurs on coniferous trees only, being found most frequently in America on the hemlock. Much more needs to be learned of its distribution. From what is known of it in Europe, one would expect to find it throughout North America as far south as Virginia, but American collections are very meager, as the following will show:

Finland, *Karsten;* Sweden, *Romell;* Germany, *Allescher;* Tyrol, *Bresadola;* Scotland, *Berkeley;* Canada, *Dearness;* New York, *Cook, Atkinson, Murrill, Mrs. Livingston;* Pennsylvania, *Gentry, Stevenson.*

SPONGIPELLIS GALACTINUS (Berk.) Pat. Tax. Hymén. 84. 1900

Polyporus galactinus Berk. Lond. Jour. Bot. **6**: 321. 1847.

Collected by Lea on rotten trunks near Waynesville, Ohio, in the autumn of 1844 and thus described by Berkeley:

"Pileus 2–3 inches broad, $1\frac{1}{2}$ inch long, dimidiate or reniform, and elongated behind, convex uneven, milk-white, clothed with strigose down of a soft, fleshy substance, zoned within and consisting of radiating fibers.

"Hymenium flat, or slightly concave. Pores $\frac{1}{100}$ of an inch broad, scarcely visible to the naked eye, but giving to the hymenium a silky lustre, white; dissepiments very thin, slightly uneven.

"Nearly allied to *Pol. undulatus* Schwein, and *Pol. symphyton* Schwein. The dried specimens are rigid, and sometimes have the margin dark brown."

This species was determined by Cooke as *P. borealis* and is usually seen under that name in collections. It may be distinguished by its smaller tubes, its less fibrous context and its habit of growing on deciduous instead of coniferous trees. One of its favorite hosts is the apple-tree, on which it has several times been found in New York and Connecticut, growing inside partially decayed trunks or emerging from knot-holes in living trees. When fresh it is pure white or watery white and so full of water that this may be squeezed out as from a sponge. On drying, it usually assumes a sordid tint, especially near the margin.

Specimens are at hand from Canada, *Dearness;* Massachusetts, *Underwood;* Connecticut, *Earle, Miss White;* New York, *Underwood, Earle, Stewart, Peck, Banker;* Delaware, *Commons;* Ohio, *Morgan, Lloyd.*

SPECIES INQUIRENDAE

BOLETUS UNDULATUS Schw. Syn. Fung. Car. 70. 1818. *Polyporus undulatus* Fr. Elench. Fung. 87. 1828. Described by Schweinitz from Carolina as follows:

"B. major subimbricatus spongiosus lutescens, pileo undulato hirto margine zonato, poris minutis candidis. Elegans fungus ad truncos rarius occurrit, in longitudinem expansus, interdum fere substipitatus, aetate indurescens. Pileus basi incrassatus, strigoso hirtus, margine substrigosus."

Fries makes the following comments on this species in the Elenchus:

"Major in longitudinem extensus, interdum postice porrectus, junior spongiosus, aetate indurescens. Pilei basi incrassati, strigoso-hirti ex Auctore, sed in meo Specimine tantum rugosi et quoad colorem fumosi. Pori minuti, obtusi, integri, in meo specimine sordidi. Caro crassa, fibrosa, subzonata, albida. Mihi *P. fumoso* proximus visus indeque hoc loco collocatus."

TRAMETES MALICOLA B. & C. Jour. Acad. Sci. Phila. II. **3**: 209. 1856. Described from specimens collected by Schweinitz on the trunk of an apple-tree at Bethlehem, Pennsylvania, and determined by him as *P. populinus* Fr., being *no. 366* in his synopsis. When his herbarium was examined by Berkeley and Curtis, this species was described as new as follows:

"Imbricatus, ligneus; pileis dimidiatis posticé decurrentibus subvillosis subzonatis, ligneo-umbrinis; poris mediis dissepimentis crassis subtomentosis."

8. BJERKANDERA Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 38. 1879

Type: *Polyporus adustus* Fr.

Merisma Gill. Champ. Fr. **1**: 688. 1878. (Not *Merisma* Persoon.) Type: *Boletus imberbis* Bull.

Myriadoporus Peck, Bull. Torrey Club **11**: 27. 1884. Type: *Myriadoporus adustus* Peck.

Hymenophore annual, epixylous, sessile, anoderm, glabrous, azonate, corky; context white, tough or woody, not friable when dry; tubes thin-walled, more or less smoke-colored, mouths polygonal; spores smooth, hyaline.

The species of *Bjerkandera* will be treated in a future paper.

9. TYROMYCES Karst. Rev. Myc. 3^9: 17. 1881

Type: *Polyporus chioneus* Fr.

Leptoporus Quél. Ench. Fung. 175. 1886. (Not *Leptopora* Raf. 1809.) Type: *Polyporus tephroleucus* Fr.

Oligoporus Bref. Unters. **8**: 114. *pl. 7. f. 12–22.* 1889. Type: *Oligoporus farinosus* Bref.

Hymenophore annual, epixylous, sessile, anoderm, azonate, glabrous or nearly so; context white, fibrous, fleshy to fleshy-tough, rigid and friable when dry; tubes thin-walled, white or yellowish, mouths polygonal; spores smooth, hyaline.

The species of *Tyromyces* will be treated in a later number of this series.

10. TRAMETES Fr. Gen. Hymen. 11. 1836.

Type: *Polyporus suaveolens* L.

Hymenophore annual, epixylous, sessile; surface anoderm, white, azonate; context white, homogeneous, coriaceous to soft-

corky; hymenium concolorous, rigid, tubes thin-walled, mouths circular to irregular; spores smooth, hyaline.

The species of this genus will be considered in a later paper.

11. **Rigidoporus** gen. nov.

Type: *Polyporus micromegas* Mont.

Hymenophore annual, at times reviving, epixylous, sessile, dimidiate, conchate, simple or imbricate; surface pelliculose, multizonate, margin thin, incurved when dry; context thin, white, woody, very rigid when dry, tubes minute, regular, light-brown, mouths pruinose when young; spores smooth, hyaline.

Rigidoporus micromegas (Mont.)

Polyporus micromegas Mont. Pl. Cell. Cuba 423. 1842.
Polyporus plumbeus Lév. Ann. Sci. Nat. III. Bot. **5**: 136. 1846.
Polystictus rufopictus Cooke, Grevillea **15**: 23. 1886.

Besides the above names, assigned to Cuba and Guadeloupe specimens, there are several manuscript names and doubtless others in publication which refer to the same species.

This plant has been generally known under the name of *P. zonalis* Berk., described from König's Ceylon collections (Ann. Mag. Nat. Hist. **10**: Suppl. 375. *pl. 10. f. 5.* 1843). It is exceedingly common in tropical America and in the states bordering the Gulf of Mexico, occurring usually during wet weather on water-soaked logs of various species of palms and other broad-leaved trees. It is very rigid when dry and the pores are almost invisible. Some of the more recent collections are here mentioned.

Cuba, *Earle, Underwood, Murrill;* Jamaica, *Earle, Underwood;* Porto Rico, *Earle, Wilson;* Florida, *Ricker;* Louisiana, *Langlois;* Alabama, *Underwood, Earle.*

12. **Earliella** gen. nov.

Type: *Earliella cubensis* sp. nov.

Hymenophore medium to large, annual, epixylous, semi-resupinate, thin and dry but rigid; surface pelliculose, glabrous, zonate, more or less reddish-brown in color; context white, coriaceous, zonate; hymenium flesh-colored, tubes medium, irregular, becoming thin-walled; spores smooth, hyaline.

Earliella cubensis sp. nov.

Pileus annual, often reviving, semi-resupinate, laterally extended, conchate, imbricate, 3–6 × 5–15 × 0.2–0.5 cm.; surface thinly encrusted, glabrous, rugose, zonate, dark reddish-brown behind, or leaving a white marginal band 3–12 mm. in width; margin tumid, at length thin, undulate or lobed, fertile; context white, coriaceous, concentrically zonate; tubes 2–3 mm. long, 2–4 to a mm., white within, the mouths deep reddish-flesh-colored, fading to white, dissepiments at first thick, at length becoming thin and irregular with wavy edges; spores ellipsoidal, smooth, hyaline, 3–4 × 5–6 μ, cystidia none.

The type plants of this species were collected by Earle and Murrill (*no. 193*) near Herradura, Cuba, March 11, 1905. They grew on a decayed fallen deciduous log in rather moist woods. The species was collected also in the central and eastern parts of Cuba, and appears to be fairly well distributed and quite abundant in the island. It is known also from Jamaica and Central America. Berkeley identified the plant as *Polystictus Persoonii* Fr., which is the same as *Daedalea sanguinea* Kl. (Linnaea **8**: 481. 1833), described from Wight's collections in the East Indies. I have this latter plant from Hawaii, China, Africa and Australia, and there is a close resemblance between it and the American plant, but I think the two are sufficiently distinct. If *P. rudis* Lév. were better known it might prove to be an earlier name for the American species in question.

Cuba, *Earle & Murrill 104, 193, 204, 584*; Jamaica, *Earle 489*; Mexico, *C. L. Smith*; Nicaragua, *Shimek*.

SPECIES INQUIRENDAE

POLYPORUS RUDIS Lév. Ann. Sci. Nat. III. Bot. **5**: 133. 1846. *Polyporus subfulvus* Cooke, Trans. Bot. Soc. Edinburgh **13**: 153. 1878. Described from plants collected by Lherminier on trunks in the island of Guadeloupe as follows:

"Pileo coriaceo-suberoso applanato elongato sessili nudo e basi ad marginem acutum sinuosum rugoso-radiato concentrice sulcato, postice nigricante, antice fulvo, poris minutis rotundis ore obtusis fuscescentibus, intus contextuque fulvis."

This description may have been made from an old discolored specimen.

13. **Cubamyces** gen. nov.

Type: *Polyporus cubensis* Mont.

Hymenophore large, annual, epixylous, sessile, thin, dry, conchate; surface pelliculose, glabrous, normally azonate; context white or yellowish, thin, homogeneous, very soft and elastic; hymenium concolorous, tubes small and regular, rather thick-walled, firm and corky, mouths entire; spores smooth, hyaline.

Cubamyces cubensis (Mont.)

Polyporus cubensis Mont. Ann. Sci. Nat. II. Bot. **8**: 364. 1837; Pl. Cell. Cuba 404. *pl. 16. f. 3.* 1842.

Originally described from plants collected near Havana, Cuba, by Sagra. It seems especially abundant in Cuba, but occurs also in southern Florida and Central America.

Cuba, *Underwood & Earle 543, 544, 596, 1111, 1204, 1443, 1568, Earle & Murrill 140, 337, 534, 414;* Florida, *Lloyd;* Nicaragua, *Smith.*

SPECIES INQUIRENDAE

POLYPORUS HAVANNENSIS B. & C. Jour. Linn. Soc. Bot. **10**: 310. 1868. Described from specimens collected by Wright on dead wood in Cuba as follows:

"Pileo dimidiato convexo zonato fulvo-ochraceo e pubescente glabro radiato-ruguloso, margine leviter pulvinato sterili pubescente; hymenio pallido, poris parvis subrotundis acie obtusis. Pileus 2 inches wide, 1 inch long; pores $\frac{1}{100}$ inch in diameter. Allied to *P. anebus*, B[erk]., but with larger pores."

This species appears to be very near to *C. cubensis.*

14. PORONIDULUS Murr. Bull. Torrey Club **31**: 425. 1904

Type: *Boletus conchifer* Schw.

Hymenophore annual, tough, sessile, epixylous, at first sterile and cup-like, the fertile portion developing from the sterile; context white, fibrous, tubes short, thin-walled, mouths polygonal; spores ellipsoidal, smooth, hyaline.

Species: *P. conchifer* (Schw.) Murr. [See Bull. Torrey Club **31**: 425, 426. 1904.]

15. CORIOLUS Quél. Ench. Fung. 175. 1886.

Type: *Polyporus zonatus* Fr.

Hansenia Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 39. 1879. (Not *Hansenia* Turcz. 1844.) Type: *Boletus hirsutus* Wulf.

Hymenophore annual, epixylous, sessile, zonate, anoderm, hairy or glabrous; context thin, white, flexible, fibrous, leathery; tubes thin-walled, white, at length splitting into irpiciform teeth in several species, mouths polygonal or irregular; spores smooth, hyaline.

The species of this genus will be treated in a later number of this series.

16. **Coriolellus** gen. nov.

Type: *Trametes Sepium* Berk.

Hymenophore small, dry, annual, epixylous, semi-resupinate; surface white, anoderm, usually azonate; context white, thin, fibrous to corky; hymenium concolorous, tubes thin-walled, usually large and irregular, dentate, but not irpiciform; spores smooth, hyaline.

Coriolellus Sepium (Berk.)

Trametes Sepium Berk. Lond. Jour. Bot. **6**: 322. 1847.

Described from specimens collected by Lea on dry fence-rails in Ohio as follows:

"Pilei effused at the base, reflexed above, laterally connate, at first often attached by the vertex or triquetrous, pale wood-coloured, finely tomentose, marked with numerous darker zones. Hymenium pallid, consisting of slightly sinuous pores about $\frac{1}{30}$th of an inch in diameter."

This species occurs on various kinds of structural timber and other dead wood, especially of deciduous trees, throughout most of temperate North America. Oak and chestnut posts and poles with the bark removed frequently supply the sporophores in great numbers. Only a few collections are here mentioned:

Canada, *Macoun;* Connecticut, *Hanmer;* New York, *Underwood, Mrs. Livingston* and *Miss Crane;* New Jersey, *Ellis;* Virginia, *Murrill;* South Carolina, *Ravenel;* Tennessee, *Murrill;* Ohio, *Lloyd;* Kansas, *Cragin.*

17. GRIFOLA S. F. Gray, Nat. Arr. Brit. Pl. **1**: 643. 1821

Type: *Boletus frondosus* Dicks.

Polypilus Karst. Rev. Myc. **3**[9]: 17. 1881. Type: *Boletus frondosus* Schrank.

Meripilus Karst. Bidr. Findlands Nat. och Folk **37**: 33. 1882. Type: *Boletus giganteus* Pers.

Cladomeris Quél. Ench. Fung. 167. 1886. Type: *Polyporus umbellatus* Fr.

Hymenophore large, annual, stipitate, compound, intricately branched or lobed, humus-loving or epixylous, rarely terrestrial, usually found at the base of a tree-trunk; surface smooth, pallid to gray or brown; context white, fleshy or fleshy-tough, rigid and fragile when dry; tubes large, irregular, thin-walled, becoming friable or laciniate with age; spores hyaline, smooth, rarely verrucose.

Species: *G. poripes* (Fr.) Murr., *G. Sumstinei* Murr., *G. frondosa* (Dicks.) S. F. Gray, *G. ramosissima* (Scop.) Murr., *G. Berkeleyi* (Fr.) Murr., *G. fractipes* (B. & C.) Murr. [See Bull. Torrey Club **31**: 333–338. 1904].

18. SCUTIGER Paul. Icon. Champ. *pl. 31. f. 1–3.* 1793

Type: *Scutiger tuberosus* Paul.

Albatrellus S. F. Gray Nat. Arr. Brit. Pl. **1**: 645. 1821. Type: *Boletus albidus* Pers.

Caloporus Quél. Ench. Fung. 164. 1886. Type: *Boletus subsquamosus* L.

Hymenophore simple, terrestrial annual, mesopous, usually bright-colored: surface anoderm, variously decorated; context white, rarely colored, fleshy to tough, rigid and fragile when dry; hymenium porose, white or colored, tubes thin-walled; spores smooth, hyaline.

Species: *S. Ellisii* (Berk.) Murr., *S. retipes* (Underw.) Murr., *S. decurrens* (Underw.) Murr., *S. cryptopus* (Ell. & Barth.) Murr., *S. laeticolor* Murr., *S. caeruleoporus* (Peck) Murr., *S. holocyaneus* (Atk.) Murr., *S. radicatus* (Schw.) Murr., *S. subradicatus* Murr., *S. griseus* (Peck) Murr., *S. persicinus* (B. & C.) Murr., *S. Whiteae* Murr. [See Bull. Torrey Club **30**: 425–432. 1903].

19. PORODISCUS Murr. Bull. Torrey Club **30**: 432. 1903

Type: *Peziza pendula* Schw.

Enslinia Fr. Summ. Veg. Scand. 399. 1849. (Not *Enslinia* Rchb. 1827.) Type: *Sphaeria pocula* Schw.

Hymenophore small, annual, tough, epixylous, erumpent from the lenticels of dead branches; stipe attached to the vertex of the pileus, usually curved at maturity; context white, fibrous, tubes cylindrical, short, one-layered, mouths constricted; spores globose, smooth, hyaline.

Species: *P. pendulus* (Schw.) Murr. [See Bull. Torrey Club **30**: 432–434. 1903].

20. ABORTIPORUS Murr. Bull. Torrey Club **31**: 421. 1904

Type: *Boletus distortus* Schw.

Hymenophore annual, tough, humus-loving; stipe normally central, often obsolete; context yellowish-white, duplex, spongy above, woody below, tubes thin-walled, mouths polygonal; spores subglobose, smooth, hyaline.

Species: *A. distortus* (Schw.) Murr. [See Bull. Torrey Club **31**: 421, 422. 1904].

21. **Microporellus** gen. nov.

Type: *Polyporus dealbatus* B. & C.

Hymenophore thin, annual, epixylous, usually flabelliform, stipitate, the stipe variously attached and sometimes much reduced; surface anoderm, multizonate; context thin, white, fibrous, rigid and fragile when dry; tubes very minute, regular, thin-walled, fragile when dry; spores smooth, hyaline.

Synopsis of the North American species

Plants white or pale brownish, the color not changing when dry.	*M. dealbatus.*
Plants lurid, becoming black when dry.	*M. holotephrus.*

Microporellus dealbatus (B. & C.)

Polyporus dealbatus B. & C. Ann. Mag. Nat. Hist. II. **12**: 432. 1853.

Polyporus mutabilis B. & C. Ann. Mag. Nat. Hist. II. **12**: 433. 1853.

Polyporus petaliformis B. & C. Jour. Linn. Soc. Bot. **10**: 307. 1868.

Polyporus polygrammus B. &. C. Jour. Linn. Soc. Bot. **10**: 307. 1868.

Polyporus Ravenelii B. & C. Grevillea **1**: 38. 1872. *Polystictus cretatus* Cooke, Trans. Bot. Soc. Edinburgh **13**: 137. 1878.

This remarkably variable plant was originally described from the collections of Curtis in South Carolina, and has since been published by the same authors under several different names. The types at Kew show abundant variations, but no good characters for specific separation. The species ranges southward to the West Indies and into South America, where it has doubtless received other names.

Collections are at hand from South Carolina, *Ravenel;* Georgia, *Ricker;* Florida, *Ravenel;* Louisiana, *Langlois;* Alabama, *Peters,*

Beaumont, Earle; Cuba, *Earle, Underwood & Earle 758, 793, 1104a, 1316, 1319, 1446.*

Microporellus holotephrus (B. & C.)

Polyporus holotephrus B. & C. Jour. Linn. Soc. Bot. **10**: 315. 1868.

Described as follows from *no. 352* of Wright's Cuban collections, although Guiana (*Leprieur 929*) is mentioned as the habitat.

"Luridus; pileo tenui coriaceo flabelliformi, e basi attenuata lineato, hic illic vinoso-tincto zonato, zonis alternis subtiliter velutinis scabris brunneis; poris 5–6-gonis brevibus minimis.

"On dead wood. Pileus $2\frac{1}{2}$ inches broad, 2 inches long, radiato-lineate; pores $\frac{1}{200}$ inch in diameter. A very curious species."

This peculiar plant, known only from the original collections, now at Kew, bears a very close resemblance to *M. dealbatus* in every respect except color. One could almost believe that a few very young plants of *M. dealbatus* had for some cause turned entirely black in drying, if the numerous other collections of this species indicated the slightest tendency in that direction. Another difference is the size of pores, those of *M. holotephrus* being entirely inconspicuous to the unaided eye.

22. POLYPORUS (Mich.) Paul. Icon. Champ. *pl. 13.* 1793.

Type: *Polyporus Ulmi* Paul.

Polyporus (Mich.) Adans. Fam. **2**: 10. 1763. Not associable with a previously published binomial.

Polyporellus Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 37. 1879. Type: *Polyporus brumalis* Fr.

Leucoporus Quél. Ench. Fung. 165. 1886. Type: *Leucoporus tubarius* Quél.

Cerioporus Quél. Ench. Fung. 167. 1886. Type: *Boletus squamosus* Huds.

Melanopus Pat. Hymén. Europ. 137. 1887. Type: *Melanopus squamosus* (Huds.) Pat.

Hymenophore annual, epixylous, small and simple, very rarely large and compound; stipe central, excentric or lateral, much reduced at times in a few species, often partly or wholly brown or black; surface usually smooth, the margin at times ciliate; context white or yellowish, fibrous, tough to corky; hymenium porose, rarely alveolate; spores smooth, hyaline.

Species: *P. hydniceps* B. & C., *P. scabriceps* B. & C., *P. virgatus* B. & C., *P. delicatus* B. & C., *P. dibaphus* B. & C., *P. polyporus* (Retz) Murr., *P. Tuba* B. & C., *P. craterellus* B. & C., *P. Acicula* B. & C., *P. discoideus* B. & C., *P. phaeoxanthus* B. & Mont., *P. columbiensis* Berk., *P. obolus* Ell. & Macbr., *P. aemulans* B. & C., *P. arculariellus* Murr., *P. arcularius* (Batsch) Fr., *P. variiporus* Murr., *P. Tricholoma* Mont., *P. Cowellii* Murr., *P. caudicinus* (Scop.) Murr., *P. maculosus* Murr., *P. elegans* (Bull.) Fr., *P. fissus* Berk., *P. arculariformis* Murr. [See Bull. Torrey Club **31**: 29–44, 1904; and Torreya **4**: 150, 151. 1904.]

Synopsis of the Polyporeae with bright-colored context

Hymenophore sessile or subsessile.	
Pores yellow.	
Context thick and fleshy, plants very large.	1. *Laetiporus.*
Context thin; plants small.	2. *Flaviporellus.*
Pores red.	
Context very soft and spongy, tubes large and irregular.	3. *Aurantiporellus.*
Context firm, tubes small.	
Surface anoderm, tubes fragile.	
Tubes orange-colored, becoming dark and resinous on drying.	4. *Aurantiporus.*
Tubes remaining orange-colored, or fading slightly.	5. *Pycnoporellus.*
Surface pelliculose, tubes firm and regular.	6. *Pycnoporus.*
Hymenophore distinctly stipitate; context yellow.	7. *Phaeolopsis.*

1. LAETIPORUS Murr. Bull. Torrey Club **31**: 607. 1904

Type: *Agaricus speciosus* Batarr.

Hymenophore annual, epixylous, fleshy, anoderm, cespitose-multiplex; context cheesy to fragile, light-colored, tubes thin-walled, fragile, bright-yellow, mouths irregularly polygonal; spores smooth, hyaline.

Species: *L. speciosus* (Batarr.) Murr. [See Bull. Torrey Club **31**: 607, 608. 1904.]

2. **Flaviporellus** gen. nov.

Type: *Polyporus Splitgerberi* Mont.

Hymenophore small, annual, epixylous, sessile or substipitate, flabelliform, yellow throughout; surface anoderm, margin thin; context very thin and friable; tubes small, thin-walled, fragile; spores smooth, hyaline or yellowish.

Flaviporellus Splitgerberi (Mont.)

Polyporus Splitgerberi Mont. Ann. Sci. Nat. Bot. II. **16**: 109. 1841. Syll. Crypt. 164. 1856.

Polyporus sulphuratus Fr. Nov. Symb. 79. 1851.

Polyporus rheicolor B. & C. Jour. Linn. Soc. Bot. **10**: 313. 1868.

This plant was described from Surinam, Mexico and Cuba successively. It is apparently rare, being known chiefly from type collections at Kew, Paris and Upsala.

3. **Aurantiporellus** gen. nov.

Type: *Polyporus alboluteus* Ell. & Ev.

Hymenophore large, annual, epixylous, effused, immarginate or narrowly reflexed; surface azonate, soft, anoderm and orange-colored when young, becoming slightly encrusted and darker with age; context orange-colored, extremely soft and spongy throughout; tubes orange-colored, very large, thin-walled, irregular, lacerate, fragile; spores smooth, hyaline.

Aurantiporellus alboluteus (Ell. & Ev.)

Fomes alboluteus Ell. & Ev. Proc. Acad. Sci. Phila. **1895**: 413. 1895.

Described from material collected by Crandall on decayed trunks of *Abies subalpina* in Colorado as follows:

"Effused and laterally connate for several centimeters, about 1 cm. thick and 5–6 cm. broad, immarginate and entirely resupinate or, in some specc. with a very slight, reflexed margin of soft, spongy texture and light orange color within and without. Pores large, 1–2 mm. diam., with a thin, membranaceous, white, toothed margin."

In 1898 (Bull. Torrey Club **25**: 513), the authors add the following notes:

"Additional specimens and notes of this species show that it is a *Polyporus* and not a *Fomes*. In the fresh growing state it is very juicy and absorbs moisture to a remarkable degree so that water may be squeezed out of it as from a sponge. Some specimens were 3–4 cm. thick. When mature the pores are prolonged on one side so as to resemble the teeth of an *Irpex*. The spores are oblong, hyaline, 8–12 × 3 μ. Allied to *Polyporus leucospongia* Cke. & Hark."

This species has apparently been found by only two botanists. The type plants were collected July 10, 1894, by C. S. Crandall, *no. 50*, upon charred trunks of *Abies* on the crest of the continental divide, Colorado, at an altitude of 3,000 meters. Specimens were later collected by Bethel, *no. 280*, at Climax, Colorado, at a height of 3,390 meters, on the ends of decaying coniferous logs projecting from the snow.

4. **Aurantiporus** gen. nov.

Type: *Polyporus Pilotae* Schw.

Hymenophore large, annual, epixylous, sessile, dimidiate; surface anoderm, sodden, bibulous, reddish-orange, soon fading; context reddish-yellow, fleshy-tough to woody, juicy when fresh, rigid when dry, conspicuously zonate; tubes small, slender, thin-walled, brilliant orange when fresh, becoming dark, resinous and fragile on drying; spores smooth, hyaline.

Aurantiporus Pilotae (Schw.)

Polyporus Pilotae Schw. Trans. Am. Phil. Soc. **4**: 156. 1834.
Polyporus Pini-canadensis Schw. Trans. Am. Phil. Soc. **4**: 157. 1834.
Polyporus hypococcinus Berk. Lond. Jour. Bot. **6**: 319. 1847.

This brilliantly colored species was first described from specimens collected on Pilot mountain, North Carolina, growing on a chestnut log. According to Morgan these specimens had lost their brilliancy when Schweinitz found them, which partly accounts for Berkeley's redescription of the species under the name of *P. hypococcinus* when Lea's younger plants were sent him from Ohio. Original specimens examined at Kew and at Philadelphia are excellently preserved and show the two species to be synonymous. No specimens are to be found, however, of *P. Pini-canadensis*, which Berkeley & Curtis in their commentary on Schweinitz's Synopsis say is certainly the same as *P. hypococcinus*. This species was described from plants found in a pine swamp near Mauch Chunk, Pennsylvania, growing on a trunk of *Pinus canadensis*, according to Schweinitz. It is possible that he was mistaken in the host. Specimens collected by Nuttall on dead deciduous logs in West Virginia are also resupinate and agree well with the description of *P. Pini-canadensis*. *P. Pilotae* and *P. hypococcinus* are only known to occur on very much decayed wood of oak and chestnut.

This species is quite rare, but those who have found it have made good notes on its appearance when fresh; attracted, no doubt, by its striking appearance. As I have observed it growing on old logs at Blacksburg, Virginia, the sporophores are ochraceous to reddish-orange at first, the pileus becoming paler and the hymenium darker with age. The substance within is honey-yellow, changing to reddish, and very zonate. On account of the rather fleshy and sodden character of the sporophore there is considerable shrinkage and change of form on drying. Specimens have been examined from Canada, *Dearness;* Iowa, *Macbride;* Delaware, *Commons* (?); Pennsylvania, *Sumstine, Murrill;* West Virginia, *Nuttall;* Virginia, *Murrill;* Ohio, *Morgan.*

SPECIES INQUIRENDAE

POLYPORUS FIMBRIPORUS Schw. Trans. Am. Phil. Soc. **4**: 155. 1834. Collected on small fallen chestnut limbs at Bethlehem, Pennsylvania, and described as follows:

"P. subtriangularis, substantia carnosa, aquose spongiosa, omnino *P. mollis*. Pileo glabro, pallido, siccitate ruguloso et contracto volumine. Poris albescentibus, rotundis, minutis, circum apices mire fimbriato ciliatis. Diametro unciali. Tempore sicco indurescit."

The above description agrees in many ways with young stages of *A. Pilotae*, but this latter species has never been collected on small limbs, its usual hosts being much-decayed chestnut or oak logs. The remains of the type specimens at Philadelphia also show a close relationship to *A. Pilotae*.

POLYPORUS CASTANOPHILUS Atk. Jour. Myc. **8**: 118. 1902. Collected by Atkinson at Blowing Rock, North Carolina, September 1901 (*no. 10072* Cornell Univ. Herb.), and thus described:

"Pileus dimidiate, sessile, convex, 10–20 cm. broad, 10–12 cm. long, zonate, more or less rugose and sometimes tomentose toward the base, reddish yellow to reddish orange, flesh yellowish, zoned, soft and watery but tough and drying somewhat shrunken but hard and firm. Tubes plane, medium size, dissepiments thin, edges very finely fimbriate, chrome yellow to bright orange, drying dull yellow or reddish brown, tubes 6–8 mm. long. Basidia clavate, 15–20 × 4–5 μ, 4-spored. Spores white, hyaline, smooth, with a few granules, 3 × 2 μ. On decorticated and one-half rotted chestnut logs."

Although I have not been able to examine the plants described above, there seems to be little doubt that they are referable to *A. Pilotae.*

5. **Pycnoporellus** gen. nov.

Type: *Polyporus fibrillosus* Karst.

Hymenophore annual, epixylous, sessile, dimidiate, simple or imbricate, reddish or orange-colored throughout; surface anoderm, margin thin; context thin, friable; tubes thin-walled, fragile, at length lacerate; spores smooth, hyaline or pale yellowish.

Pycnoporellus fibrillosus (Karst.).

Polyporus fibrillosus Karst. Sydv. Finl. Polyp. 30. 1859.

Polyporus aurantiacus Peck, Rep. N. Y. State Mus. Nat. Hist. **26**: 69. 1874.

Inonotus fibrillosus Karst. Bidr. Finl. Nat. och Folk **37**: 72. 1882.

In 1876 Karsten considered this species synonymous with *Polyporus vulpinus* Fr., but later said the two were very different. According to Bresadola, *Ochroporus lithuanicus* Blonski (Hedwigia 281. 1889) is a true synonym of *P. fibrillosus.*

This species is rarely found in Asia, Europe and northern North America on decaying logs of fir, spruce and other conifers. Its bright colors make its discovery easy, while the fragile tubes and rigid, friable context distinguish it readily from *Pycnoporus cinnabarinus.*

Finland, *Karsten;* Canada, *Macoun;* New York, *Peck;* Vermont, *Burt;* Colorado, *Bethel;* Oregon, *Carpenter.*

6. PYCNOPORUS Karst. Rev. Myc. **3**[9]: 18. 1881

Type: *Boletus cinnabarinus* Jacq.

Hymenophore annual, sometimes reviving, epixylous, sessile, dimidiate, simple or imbricate, rarely pseudo-stipitate; surface anoderm, slightly pelliculóse at times, zonate or azonate, bright or dull red; context red, soft-corky to punky; hymenium concolorous, tubes small, firm, thin-walled; spores smooth, hyaline.

Species: *P. cinnabarinus* (Jacq.) Karst., *P. sanguineus* (L.) Murr. [See Bull. Torrey Club **31**: 420, 421. 1904.]

7. **Phaeolopsis** gen. nov.

Type: *Polyporus Veraе-crucis* Berk.

Hymenophore annual, expixylous, stipitate; surface azonate,

anoderm, yellow or brown; margin acute; context yellow, fleshy to tough and fibrous, not friable; tubes yellow, regular, minute, thin-walled; spores, smooth, hyaline: stipe excentric or lateral with substance and surface like that of the pileus.

Phaeolopsis Verae-crucis (Berk.)

Polyporus Verae-crucis Berk. Ann. Mag. Nat. Hist. **10**: Suppl. 369. *pl. 9–12.* 1843.

Described from plants collected on the roots of trees at Vera Cruz, August, 1854. Type plants at Kew are in an excellent state of preservation. The context of these herbarium specimens is dark yellowish-orange and the stipe excentric or lateral.

SUBFAMILY 2. FOMITEAE

Synopsis of the Fomiteae with white or flesh-colored context

Tubes at first concealed by a volva.	1. *Cryptoporus.*
Tubes free from the first.	
Surface of hymenophore covered with reddish-brown varnish; context corky.	2. *Ganoderma.*
Surface of hymenophore not as above, or, if so, context woody.	3. *Fomes.*

1. CRYPTOPORUS Shear, Bull. Torrey Club **29**: 450. 1902

Type: *Polyporus volvatus* Peck.

Hymenophore subglobose, sessile, epixylous; surface smooth, encrusted; context white, corky; tubes white, concealed at first by a volva, which breaks at one or more points at maturity; mouths constricted, discolored; spores smooth, hyaline.

Species: *C. volvatus* (Peck) Shear. [See Bull. Torrey Club **30**: 423, 424. 1903.]

2. GANODERMA Karst. Rev. Myc. **3**[9]: 17. 1881

Type: *Boletus lucidus* Leyss.

Placodes Quél. Ench. Fung. 170. 1886. Type: *Boletus lucidus* Leyss.

G. Tsugae Murr. and a few other species of this genus might be classed with white-fleshed forms, especially in their early stages. [See Bull. Torrey Club **29**: 599–608. 1902].

3. FOMES Gill. Champ. Fr. **1**: 682. 1878

Type: *Polyporus marginatus* Fr.

Fomitopsis Karst. Rev. Myc. **3**[9]: 18. 1881 Type: *Boletus pinicola* Sw.

Heterobasidion Bref. Unters. **8**: 154. 1889. (Not *Heterobasidium* Mass. 1888.) Type: *Polyporus annosus* Fr.

Hymenophore sessile, ungulate or applanate, epixylous; surface anoderm or encrusted, sulcate, rarely zonate; context white or flesh-colored, woody, rarely punky; tubes cylindrical, concolorous, usually thick-walled, stratose; pores smooth, hyaline.

Species: *F. roseus* (Alb. & Schw.) Cooke, *F. annosus* (Fr.) Cooke, *F. ungulatus* (Schaeff.) Sacc., *F. Ellisianus* Anders., *F. fraxinophilus* (Peck) Sacc., *F. igneus* (Berk.) Cooke, *F. stipitatus* Murr., *F. perpusillus* (Pers.) Cooke, *F. scutellatus* (Schw.) Cooke, *F. Laricis* (Jacq.) Murr., *F. populinus* (Schum.) Cooke, *F. Meliae* (Underw.) Murr., *F. rubritinctus* Murr., *F. geotropus* Cooke. [See Bull. Torrey Club **30**: 225–232. 1903.]

An original specimen of Persoon's *Polyporus perpusillus*, published by Léveillé in 1844, shows this plant to be the same as *Trametes ohiensis* Berk., published in 1872. Persoon's name, therefore, must be adopted instead of the one under which the species is commonly known. Considering the very small size of the species, the older name seems exceedingly appropriate.

To the above list of species should be added **Fomes Auberianus** (*Polyporus Auberianus* Mont. Pl. Cell. Cuba 397. 1842), described from Cuban plants collected by Auber. It is a large and striking species found on wounded trunks or dead logs of hardwood trees throughout tropical America. Material is at hand from Cuba, *Earle, Earle & Wilson 253, Earle & Murrill 4;* Porto Rico, *Wilson 32;* St. Kitts, *Britton & Cowell 328;* Martinique, *Duss;* Mexico, *Smith.*

SUBFAMILY 3. AGARICEAE

Synopsis of the Agariceae with white context

Surface glabrous, hymenium usually labyrinthiform.	1. *Agaricus.*
Surface pubescent or hirsute.	
Hymenium at first labyrinthiform, soon becoming irpiciform.	2. *Cerrena.*
Hymenium lamellate, not becoming irpiciform.	3. *Lenzites.*

1. AGARICUS (Dill.) L. Sp. Pl. 1176. 1753

Type: *Agaricus quercinus* L.

Striglia Adans. Fam. **2**: 10. 1763. Type: *Agaricus quercinus* L.

Daedalea Pers. Syn. Fung. 499. 1801. Type: *Agaricus quercinus* L.

Daedaleopsis Schroet. Krypt. Fl. Schles. **3**: 492. 1888. Type: *Boletus confragosus* Bolt.

Hymenophore epixylous, usually large and annual, sessile, applanate to ungulate; surface anoderm, glabrous, often zonate: context white or wood-colored, rigid, woody or punky: hymenium normally labyrinthiform, but varying to lamellate and porose in some species: spores smooth, hyaline.

Species: *A. quercinus* L., *A. juniperinus* Murr., *A. confragosus* (Bolt.) Murr., *A. Aesculi* (Schw.) Murr., *A. deplanatus* (Fr.) Murr. [See Bull. Torrey Club **32**: 83–95. 1905.]

2. CERRENA S. F. Gray Nat. Arr. Brit. Pl. **1**: 649. 1821

Type: *Boletus unicolor* (Bull.) Bolt.

Phyllodontia Karst. Hedwigia **22**: 163. 1883. Type: *Phyllodontia Magnusii* Karst.

Hymenophore small, epixylous, sessile, conchate, annual; surface anoderm, hairy, zonate or sulcate; context thin, white, fibrous, flexible; hymenium at first labyrinthiform, soon becoming irpiciform from the splitting of the dessepiments; spores smooth, hyaline.

Species: *C. unicolor* (Bull.) Murr. [See Bull. Torrey Club **32**: 97–99. 1905.]

3. LENZITES Fr. Gen. Hymen. 10. 1836

Type: *Daedalea betulina* (L.) Fr.

Hymenophore small, annual, epixylous, sessile, conchate: surface anoderm, usually zonate and tomentose; context white, coriaceous, flexible; hymenium lamellate, the radiating gill-like dissepiments connected transversely at times, especially in youth; spores smooth, hyaline.

Species: *L. betulina* (L.) Fr., *L. cubensis* B. & C. [See Bull. Torrey Club **32**: 95–97. 1905.]

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Onosmodium

KENNETH KENT MACKENZIE

The genus *Onosmodium*, founded in 1803 by Michaux, is a genus of *Boraginaceae* exclusively confined to North America and very largely to that portion of the United States east of the Rocky Mountains. The species are closely related and their proper identification has given much trouble to collectors, as evidenced by the large number of incorrectly labeled specimens found in herbaria. Many of the characters given in the standard manuals are not constant, and are misleading unless used with considerable discrimination; this probably accounts for the great number of errors in herbarium determinations. The following notes are based on an examination of the specimens contained in the herbaria of the Missouri Botanical Garden, the New York Botanical Garden, and Columbia University, and in the author's private herbarium.

Properly limited, the genus is a very natural one and may be characterized as follows:

Erect, rough-hairy, branching, very leafy perennials, with alternate, entire, strongly veined leaves, and numerous flowers in terminal, leafy-bracted, scorpioid racemes. Flowers whitish, greenish-white or yellowish, from sessile to short-pedicelled, the pedicels usually somewhat elongating in fruit. Calyx shorter than the corolla, deeply 5-parted. Corolla tubular, slightly enlarged at the throat, 5-lobed, glabrous within, more or less hairy outside, the lobes erect, acute or acuminate, the sinuses somewhat inflexed. Stamens five, inserted on the corolla, included; filaments minute; anthers glabrous, narrowly arrow-shaped, acutish, the apex just about level with the sinuses of the corolla. Ovary four-parted. Style filiform, exserted, long persistent. Nutlets 4 mm. long or less, usually but one or two maturing, globular to ovoid, smooth or sometimes sparingly pitted, white to dingy whitish-brown, in some species noticeably constricted below, attached at base to the nearly flat receptacle, the scar of attachment about 2 mm. wide. (Greek, "like *Onosma*," an old-world genus of *Boraginaceae*.) Seven species, confined to the United States and Canada.

It will be noticed that under this characterization the plant called *Onosmodium Thurberi* by A. Gray (Syn. Fl. **2**[1]: 205. 1878) does not fall within this genus. That species, however, is so self-evidently not congeneric with real *Onosmodium* that I feel no hesitation in removing it therefrom. It differs from *Onosmodium* in the greatly elongated corolla, exserted stamens, long filaments and versatile anthers, in usually ripening more nutlets, and in the persistence of the enlarged base of the style. For the present I refer it to *Macromeria* as **Macromeria Thurberi.** It seems certainly congeneric with *M. viridiflora* DC., *M. cinerascens* DC., and *M. discolor* Benth. Whether these species are congeneric with the original species of Don I cannot determine at present, the material I have seen being too scanty.

Onosmodium strigosum G. Don, Gen. Syst. **4**: 317 (1838), and *Onosmodium eriocaulon* A. DC. in DC. Prodr. **10**: 70 (1846), both from Northern Mexico, may be the same. The former as represented in herbaria is not an *Onosmodium*, the corolla and anthers both being very different. Of the latter I have seen no specimens.

The species of true *Onosmodium* which I have been able to recognize may be distinguished as follows:

Bracts ovate, rounded at base; fruiting pedicels usually exceeding the sepals; corolla 5–7 mm. long. 1. *O. Helleri.*

Bracts narrower, tapering at base; fruiting pedicels rarely as long as the sepals; corolla 9 mm. long or longer.

Corolla-lobes narrowly lanceolate-acuminate, two to three times as long as wide.

Pubescence appressed. 2. *O. virginianum.*

Pubescence spreading. *O. virginianum hirsutum.*

Corolla-lobes broadly triangular-acute, little longer than wide.

Stem not glabrous below the branches.

Nutlets noticeably pitted; calyx-lobes 6 mm. long or less, noticeably soft-pubescent. 3. *O. molle.*

Nutlets little if at all pitted; calyx-lobes hispid.

Corolla-lobes merely acute.

Nutlets strongly constricted at base.

Nutlets less than 3 mm. long. 4. *O. hispidissimum.*

Nutlets about 4 mm. long. *O. hispidissimum macrospermum.*

Nutlets not strongly constricted at base.

Nutlets 4 mm. long (rarely a little less). 5. *O. occidentale.*

Nutlets 3 mm. long (rarely 3.5 mm. long). *O. occidentale sylvestre.*

Corolla-lobes acuminate, often strongly so. 6. *O. bejariense.*
Stem glabrous below the branches. 7. *O. subsetosum.*

1. ONOSMODIUM HELLERI Small

Onosmodium Helleri Small, Fl. Southeast. U. S. 1000. 1903.

Perennial, 3–4 dm. high, short-pubescent all over with scattered hairs or densely soft-pubescent on the leaves beneath: leaves obtusish, short-petioled, 8–10 cm. long, 3–5 cm. wide, the lower broadly spatulate and tapering to the base, the middle broadly oblong-elliptical and rounded at base; bracts broadly ovate (at least the lower): fruiting pedicels 7–15 mm. long, usually exceeding the sepals: calyx-lobes 7–10 mm. long, linear, obtusish, ciliate: corolla not seen: nutlets obtusish, 3 mm. long, ovate-orbicular, apparently not constricted at base.

Type collected by A. A. Heller, April 30, 1894, along Bear Creek, Kerr County, Texas, *no. 1682*. A flowering specimen with corollas 5–7 mm. long and acute-triangular teeth pubescent outside, and generally resembling this species, is provisionally referred here, for the reason that the leaves are all merely oblanceolate or spatulate, but the specimen is young and the leaves are probably not fully developed.

This species is easily distinguished from all others by the characters given in the key and, in addition, by the short-petioled leaves. It seems to be confined to southwestern Texas, and has been rarely collected.

SPECIMENS EXAMINED. TEXAS: type specimen as cited above; *W. L. Bray 26*, 25 March 1898, Mt. Barker, Austin (the flowering specimen cited above); *Lindheimer*, 1850, "Texas"; *Reverchon 156*, June 1884, Bandera Pass.

2. ONOSMODIUM VIRGINIANUM (L.) DC.

Lithospermum virginianum L. Sp. Pl. 132. 1753.
Onosmodium hispidum Michx. Fl. Bor. Am. **1**: 133. 1803.
Onosmodium virginianum A. DC. Prodr. **10**: 70. 1846.
? Onosmodium scabrum R. & S. Syst. **4**: 57. 1819.

An erect perennial, 3–4.5 dm. high, or sometimes more, branching above with spreading branches; stems and branches usually shortly appressed-strigose: leaves from oblong-elliptical to narrowly spatulate, typically 5.4 cm. long and 1.4 cm. wide, usually rather strongly obtuse, but occasionally quite acute, 3–5 nerved,

shortly appressed-strigose on both sides, the pubescence above sometimes quite papillose, but never as strongly developed as in the other species: bracts oblanceolate: fruiting pedicels 6 mm. long or less: calyx-lobes lanceolate-acuminate, 6–8 mm. long, hairy with spreading pubescence: corolla 9 mm. long (less than twice the length of the calyx), glabrous, light-yellowish, the lobes 3 mm. long, narrowly lanceolate-acuminate bearing apical tufts of hairs: nutlets 2.5 mm. long or less, obtusish or acutish, little if at all constricted at base.

All other species of *Onosmodium* have dirty-white corollas often distinctly tinged with green, but *O. virginianum* has distinctly yellow corollas, a character which added to the peculiar corolla-lobes readily distinguishes it from all others.

The standard manuals of the country give this species a range over the entire United States east of Kansas, but I have been able to find no specimens collected very far from the Atlantic or Gulf coasts, and am convinced that the specimens collected in the interior of the United States and referred to this species have been wrongly determined. This conclusion is borne out by the fact that in the collections examined by me are numerous specimens from the interior erroneously referred to this species, and it is on these specimens I believe that the extended range is based. As far as I can determine, the species, with its variety mentioned below, ranges along the Atlantic coast from Connecticut to Florida and thence west along the Gulf coast to Louisiana.

SPECIMENS EXAMINED. CONNECTICUT: *Bissell*, 6 August 1901, Oxford. NEW JERSEY: *Parker*, 2 June 1865, Burlington County; *Pollard*, 25 September 1897, Clementon. PENNSYLVANIA: *Britton*, 4 July 1899, Point Pleasant. VIRGINIA: *Addison Brown et al.*, 7 June 1890, Peaks of Otter; *Small & Heller*, 3 June 1891, Danville. NORTH CAROLINA: *Biltmore Herbarium 4253*, 17 June 1897, Hamlet, Richmond County. SOUTH CAROLINA: *Gibbes*, May 1834, Columbia; *Gibbes*, 1886, Andersonville. GEORGIA: *Beyrich 266*; *Cuthbert*, 3 May 1900, Augusta; *Small*, 9–12 July 1895, Albany, Dougherty County; *Small*, 20 July 1893 and 2 July 1895, McGuire's Mill, Gwinnet County. FLORIDA: *Curtiss 6611*, 9 May 1900, Seville, Volusia County; *Curtiss 2098*, April-May, Duval County; *Curtiss 4379*, 11 April 1893, Jacksonville; *Curtiss 4723*, 28 April 1894, Jacksonville; *Lighthipe 633*, April

1897; *Phillips*, Duval County; *Nash*, March 12–31 and May 4 1894, also 28 May 1895, Eustis, Lake County; *Hitchcock*, June and July 1898, Lake City; *Hitchcock*, June and July 1894, Eustis; *Rugel*, July 1843, Aspalaga; *Ohlinger*, 12 April 1894, Polk County; *Ferguson*, 8 August 1898, Tampa; *Huger*, April 1900, "Fla."; *Barrows* (1834), *Cozzens*, *Chapman*, and *Buckley*, "Fla." ALABAMA: *Earle & Baker*, 29 May 1897, Auburn, Lee County. LOUISIANA: *Hale*, Alexandria.

Onosmodium virginianum hirsutum var. nov.

Pubescence spreading; often strongly so.

This form differs from typical *O. virginianum* in the one character only, but on this account has sometimes been confused with other species. It seems to be confined to the southeastern United States; I have seen specimens from Alabama, Georgia, Florida and Mississippi.

SPECIMENS EXAMINED. GEORGIA: *Allmendinger*, Kennesaw Mt. ALABAMA: *Earle & Baker*, 29 May 1897, Auburn, Lee County (type specimen). FLORIDA: *Chapman; Curtiss 2098*, May, Jacksonville. MISSISSIPPI: *Hilgard*, May 1859; *Tracy 3113*, 3 May 1896, Columbus. SOUTHERN STATES: *Buckley*.

3. ONOSMODIUM MOLLE Michx.

Onosmodium molle Michx. Fl. Bor. Am. 1: 133. 1803; not of late American authors.

An erect, much-branched perennial, about 6–7 dm. high, the stem below the branches hispid or in age appressed-strigose, the branches rather densely clothed with short, soft pubescence: larger leaves about 2 cm. broad and 5 cm. long, densely soft-pubescent all over with whitish hairs, the pubescence above and on the veins below spreading, the papillose character of some of the pubescence on the upper surface of the leaves hidden by the density of the pubescence; leaves lanceolate or narrowly ovate-lanceolate, acute, the lateral veins about three pairs: branchlets 3–12 cm. long, the bracts resembling reduced leaves: fruiting pedicels stout, less than 4 mm. long: calyx-lobes 6 mm. long, linear-oblong, obtuse or obtusish, barely twice the length of the nutlets, whitish-pubescent, not strongly nerved: corolla 8–12 mm. long, the triangular-acute lobes 2–3 mm. long, the pubescence on the exterior of the corolla confined almost entirely to the lobes: nutlets less than 3 mm. long, obtusish, usually strongly pitted for the genus, and often somewhat constricted at the base.

This species was founded by Michaux on a plant collected near Nashville, Tennessee, and the above description is largely based on fruiting specimens gathered near the same place by the collectors for the Biltmore Herbarium, and on flowering specimens collected by Dr. Gattinger. The western species to which this name has been applied by the later botanists differs from this one in the larger, less pitted, and never constricted nutlets; in the corolla, which is larger and much more pubescent externally; in the longer strongly-nerved sepals; and in being a much rougher plant.

Onosmodium hispidissimum, with its hispid stem and noticeably constricted nutlets, is easily distinguished.

As far as known *Onosmodium molle* is confined to the barrens of Tennessee and Kentucky, and is a comparatively rare plant in collections.

SPECIMENS EXAMINED. KENTUCKY: *C. W. Short*, 1840. TENNESSEE: *Gattinger*, May, Cedar Barrens of Middle Tennessee; *Biltmore Herbarium 5702*, 7 August 1895, Nashville.

4. **Onosmodium hispidissimum** nom. nov.

Onosmodium carolinianum of American authors; not *Onosmodium carolinianum* A. DC. Prodr. **10**: 70. 1846; nor *Onosmodium molle* Michx. Fl. Bor. Am. **1**: 13. 1803; nor *Lithospermum carolinianum* Lam. Tabl. Encyc. **1**: 367. 1791.

An erect perennial, often 9–12 dm. high, strongly branching above, the branches spreading or ascending; stem and branches thickly covered with spreading hispid whitish (or in the inflorescence yellowish-white) hairs 2–4 mm. long, the branches and often the stem also appressed-pubescent: leaves typically lanceolate, 8 cm. long and 14 mm. wide, sometimes 2.5 cm. wide and 1 dm. long, acute or acutish, tapering to the sessile base, prominently 5–7-nerved on both surfaces, strongly covered with whitish or sometimes yellowish-white spreading papillose hispid hairs above and on the veins beneath, and appressed-strigose between the veins beneath: bracts 8–16 mm. long, resembling the leaves in outline: fruiting pedicels from very short to 4 mm. long: calyx-lobes linear-oblong, obtuse or obtusish, 4–6 mm. long, strongly hispid with yellowish-white hairs: corolla (in earlier flowers, at least) 14–18 mm. long, twice the length of the flowering calyx, sparingly canescent outside below the lobes, but usually strongly canescent and with strongly developed tufts of hairs at the tip of the broadly triangular-acute lobes, which are about 3 mm. long:

nutlets 2–3 mm. long, very obtuse to acutish, strongly constricted at base, suborbicular to ovoid, dull, little if at all pitted.

Onosmodium carolinianum A. DC. is based on *Lithospermum carolinianum* Lam. and on *Onosmodium molle* Michx., the last named being cited as a synonym. That *O. molle* is distinct admits of little question. The short description of *Lithospermum carolinianum* given by Lamarck lays particular stress on its *obtuse* corolla-lobes, a character which shows it is not an *Onosmodium*. He also speaks of its ovate-lanceolate leaves. His description certainly does not answer to the plant to which the name *O. carolinianum* is applied by American authors. DeCandolle himself in taking up this latter name noticed the discrepancies between the descriptions of Lamarck and Michaux, and asked if there were not two species. He apparently knew neither of the species himself. In addition to this, Dr. Britton has kindly examined the specimen of *Lithospermum carolinianum* in Lamarck's herbarium in Paris. It is *Lithospermum Gmelini* (Michx.) A. S. Hitchcock, and was collected by Fraser in Carolina. Being the earliest name for this last species, it should be applied to it. It follows that neither the plant of Lamarck nor the plant of Michaux is the *Onosmodium carolinianum* of authors. Under the circumstances I have given the name of *Onosmodium hispidissimum* to the species now under discussion, it being the most hispid species of the genus.

SPECIMENS EXAMINED. NEW YORK: "*L. E. G.*", Onondaga Valley; *S. B. Buckley*, September 1831, Head of Seneca Lake; *Lucy 764*, Chenango County. VIRGINIA: *Small*, 20 July 1892, Marion, Smyth County; *A. Brown et al.*, 5 June 1890, Roanoke. WEST VIRGINIA: *Millspaugh*, 12 August 1891, Hinton. MARYLAND: *Shriver*, 7 August 1891, Cumberland. NEBRASKA: *Hayden*, 9 June 1853, near Council Bluffs. MISSOURI: *Engelmann*, July 1842, St. Louis; *Bush*, 3 July 1892, Sheffield; *Bush 361*, 15 June 1895, Independence; *Mackenzie 272*, 17 July 1898, Randolph, Clay County; *Mackenzie 1161*, 30 May 1895, Jackson County. KANSAS: *Mackenzie*, 31 May 1897, Wyandotte County. LOUISIANA: *Hale*, Alexandria. TEXAS: *Reverchon 649*, 1880, Dallas. INDIAN TERRITORY: *Palmer 206*.

Onosmodium hispidissimum macrospermum Mackenzie & Bush, var. nov.

Differs from the type principally in the nutlets being larger (4 mm. long) and shining-white: the bracts are also larger and more strongly two-ranked.

This variety, which is often noticeably distinct, is found in Missouri and Illinois in low rich woods or on low prairies, and never on dry hills with the type. The large shining nutlets contrasted with the small dull nutlets of the type are very striking. Type collected by myself near Atherton, Jackson County, Missouri, 7 September 1895.

SPECIMENS EXAMINED. MISSOURI: type specimens; *Bush 363*, 7 September 1895, Atherton (collected at the same time as the type specimens); *Bush 396*, 9 July 1894, Independence, and Jackson County, 2 August 1893. ILLINOIS: *Mead*, Augusta.

5. **Onosmodium occidentale** nom. nov.

Onosmodium carolinianum molle A. Gray, Syn. Fl. **2**[1]: 205. 1878, and later American authors; not *Onosmodium molle* Michx., *vide supra*.

Usually only 3–6 dm. tall, but occasionally 10–12 dm., branching above or often from near the base, the branches spreading or almost erect; plant clothed all over with a silvery-white or sometimes a slightly yellowish appressed or more or less spreading canescent pubescence (in northern and mountain plants sometimes quite green and noticeably spreading) usually not exceeding 2 mm. in length, the pubescence of the branches and leaves usually appressed: leaves typically about 5 cm. long and 1.5 cm. wide, acutish, prominently 5–7-nerved on both surfaces, the pubescence sometimes strongly spreading and papillose, but most typically soft, appressed and hardly papillose: bracts 6–24 mm. long, often 2-ranked, resembling the leaves in outline: fruiting pedicels from very short to 6 mm. long: calyx-lobes lanceolate, acute, acutish or obtusish, rarely linear-oblong, 6–12 mm. long, canescent or with somewhat spreading hairs: corolla 12–20 mm. long, canescent all over outside, the broadly triangular acute lobes (3–4 mm. long) usually with apical tuft of hairs not strongly noticeable: nutlets 3.5–4 mm. long, ovoid, acutish or acute, not constricted at base, dull in color, little if at all pitted.

This is the common *Onosmodium* of the western part of the country and the most common species in herbaria. It has here-

tofore been referred to *O. molle* Michx., a species which as already related I believe to be distinct. It ranges from Illinois to Athabasca, Alberta, Montana, New Mexico and Texas, and seems to be a fairly common plant in all this vast extent of country.

SPECIMENS EXAMINED. ILLINOIS: *Buckley*, July 1838; *Riehl 356*, June 1840. MINNESOTA: *Hasse*, 12 July 1882, Union County. IOWA: *Holway*, 12 July 1888, Decorah; *Hitchcock*, 1889, Ames; "*G. W. C.*", 18 September 1895, Des Moines; *Arthur*, 1875, "Iowa"; *Fitzpatrick*, 6 October 1894, Johnson County; *Mackenzie 261*, 12 July 1893, Muscatine County. MISSOURI: *Demetrio*, 30 May 1896, Saline County; *Bush*, 5 August 1893, Atchison County; *Bush 475*, 11 July 1894, and *462*, 1 June 1894, Watson; *Bush*, 6 July 1892, Jackson County; *Bush 532*, and *Mackenzie*, 10 June 1896, Waldo Park, Jackson County; *Mackenzie*, 22 August 1897, Red Bridge; *Mackenzie 322*, 14 August 1898, Lee's Summit; *Mackenzie*, 18 June 1899, Lee's Summit; 1837, St. Louis; *Bush 362*, 13 July 1894, Corning. KANSAS: *Norton 351*, 12 June 1895, Riley County; *Norton & Dorman*, 28 July 1893, Manhattan; 1891, Manhattan; *White*, May 1898, Cowley County; *Kellerman*, 1887, Olathe; *E. E. Gayle*, 18 June 1892, Ft. Riley; *A. B. Snow*, Kansas-Nebraska line; *Oyster*, 10 June 1883, Miami County. NEBRASKA: *Webber*, 4 July 1889, Broken Bow; *Rydberg*, 13 June 1891, Kearney County; *Hayden*, June 1853, Ft. Pierre; *H. Engelmann*, June 1858, Ft. Kearney; *Webber*, July 1889, Lincoln. SOUTH DAKOTA: *Wallace*, 9 July 1896, Corn Creek; *Williams & Corbett 219*, 16 August 1894, Big Stone; *L. W. Carter*, 8 August 1897, Devils' Tower; *Rydberg*, 16 June 1892, Hot Springs. NORTH DAKOTA: *M. A. Brannon 267*, 20 June 1896, Grand Forks; *Williams*, July 1889, Brookings (Dakota). MANITOBA: *E. S. Thompson*, 1898. ALBERTA: *Macoun 23965*, 24 August 1897, McLeod. ATHABASCA: *Macoun 11841*, 3 August 1895, Belly River. MONTANA: *Williams*, 5 June 1886, Big Falls of Missouri. WYOMING: *A. Nelson 206*, 20 July 1894, Hartville; *Pammel & Stanton 9*, 6 June 1897, Sheridan; *Tweedy 3576*, 15 June 1900, Sheridan, and *2596*, September 1899, Dayton. COLORADO: *Hulse*, 1870; *Britton*, 8 October 1882, Golden; *Osterhout 2461*, 25 June 1901, Boulder; *J. H. Cowen*, 10 July 1893, Ft. Collins; *Jones*, 12 June 1878,

Platte River, Denver; *Engelmann*, 6 August 1874, Empire; *Braudegee*, 9 July 1873, Cañon City; *Cowen*, 25 June 1895. TEXAS: *Reverchon*, 1880, Dallas, and 3 March 1884, Industry; *Lindheimer*; *Hall*, 26 May 1872, Burton. NEW MEXICO: *Fendler*, 1847. MISC.: Frémont's Expedition to Rocky Mountains, 1842, *no. 814*, Walla Walla to Ft. Benton; 10 June 1881, Long's Expedition to Missouri River.

Onosmodium occidentale sylvestre var. nov.

An erect perennial, apparently about 10–12 dm. high, the stem below the branches densely pubescent with spreading whitish rather soft hairs 2–4 mm. long, the hairs on the branches more appressed, but many of them also spreading; branches spreading or ascending at maturity, 2–3 dm. long, usually forking; leaves lanceolate, entire or slightly undulate, the main stem-leaves 7–10 cm. long and 2.5 cm. wide or a little less, acute at apex, tapering to the sessile or very nearly sessile base, the 3–4 pairs of lateral veins prominent on both sides, the leaves papillose-hispid above, softly pubescent below, especially on the veins: bracts strongly 2-ranked, ovate-lanceolate or narrower, the lower 3 cm. long and 12 mm. wide, the terminal ones half that size: fruiting pedicels stout, 4–8 mm. long: calyx-lobes 10 mm. long, linear-oblong, acutish, 3–4 times the length of the nutlets, strongly rather short-pubescent: late corolla 9 mm. long, short-canescent outside, the tips somewhat hairy, the lobes deltoid in outline, 2 mm. long, acute but not acuminate: nutlets whitish, shining, 5 mm. long, ovate, acute, not constricted at base and little pitted.

This variety has the aspect and habit of *Onosmodium hispidissimum*, but differs in its non-constricted nutlets. From typical *O. occidentale* it differs in its larger size, more spreading and shaggy pubescence, smaller nutlets and less canescent corolla. From *O. bejariense* it differs in its merely acute corolla-lobes and in having leaves not strongly paler beneath than above, as well as in geographical range. It may well be specifically distinct from *Onosmodium occidentale*, but as that species is very variable, I have concluded to retain it as a variety merely. It seems to be confined to the region around St. Louis, being found in both Illinois and Missouri. The type was collected by *Dr. Engelmann* on July 21, 1861, in woods in the American bottom in Illinois opposite St. Louis, and is in the herbarium of the Missouri Botanical Garden.

SPECIMENS EXAMINED. ILLINOIS: type specimens; *A. S. Hitch-*

cock, 17 July 1890, Fish Lake. MISSOURI: *Eggert*, 12 July 1877, St. Louis.

6. ONOSMODIUM BEJARIENSE A. DC.

Onosmodium bejariense A. DC. in DC. Prodr. **10**: 70. 1846.

An erect perennial, about 6–9 dm. high, branching above, the branches ascending; stem, especially below the branches, strongly hispid pubescent with white or whitish hairs 4–6 mm. long; branches softly appressed-pubescent, also with numerous spreading whitish hairs 2–4 mm. long: leaves lanceolate or the lower oblanceolate-spatulate and long-tapering at the base, the well-developed stem-leaves 8–13 cm. long and 14 mm. wide, acute, sessile, strongly 5–7-nerved, the nerves prominent on both surfaces, softly appressed-pubescent below, or sometimes nearly glabrous between the veins, occasionally with spreading pubescence also on the veins, strigose-pubescent with papillose hairs above, noticeably paler beneath than above, at least in the case of the later leaves: pedicels 6 mm. long or less, the calyx-lobes linear-lanceolate, 8–10 mm. long, acute, appressed-pubescent and long-ciliate at base: well-developed corollas 14 mm. long, very finely canescent outside, often appearing nearly glabrous, and with a few spreading hairs on the lobes, the lobes 3–4 mm. long, triangular in outline, but tapering to a long-acuminate often abruptly bent apex: nutlets 3 mm. long, obtusish or acutish, from little to quite noticeably constricted at base.

A species as yet known only from southwestern Texas, from whence it was first described.

SPECIMENS EXAMINED. TEXAS: *Lindheimer*, 1848, New Braunfels; *Wilkinson 89*, 1897, and *125*, San Antonio; *Lindheimer*, 1844, Brazos; *Jermy*, Gillespie County; *Stanfield 98*, San Marcos; *Bush 1208*, 24 March 1902, San Antonio.

7. ONOSMODIUM SUBSETOSUM Mackenzie & Bush

Onosmodium subsetosum Mackenzie & Bush; Small, Fl. Southeast. U. S. 1001. 1903.

An erect perennial, about 6–10 dm. high, branching above, the branches ascending; stem very glabrous, with the exception of a very few short widely scattered appressed hairs; branches appressed-pubescent with very short white hairs, the pubescence not at all spreading: leaves lanceolate, 9 cm. long or less, 10–18 mm. wide, typically 2.5 cm. long and 14 mm. wide, strongly acute, tapering to the sessile or very nearly sessile base, prominently 5–7-nerved, appressed papillose-hispid above and whitish appressed-

pubescent below: bracts 12–24 mm. long, resembling the leaves in outline: pedicels 3–6 mm. long (at least in fruit): calyx-lobes oblong, obtuse, 6 mm. long, hairy on both sides with short somewhat spreading white hairs, and more or less ciliate: corolla 10 mm. long, twice the length of the flowering calyx, soft-canescent above outside, its lobes triangular in outline, acute, barely 2 mm. long: nutlets ovoid, obtuse or acutish, 2–3 mm. long, little if at all constricted at base, but sometimes quite pitted.

This species differs from all others known to me in the glabrous stem (not branches), which strikingly differentiates it. It is confined to the Ozark Mountain region of Missouri and Arkansas, and is usually labeled "*Onosmodium virginianum*" in herbaria, but it has no close affinity to that species. The type was collected by B. F. Bush, *no. 135*, near Eagle Rock, Missouri, in barrens, July 11, 1897.

SPECIMENS EXAMINED. MISSOURI: type specimens; *Mackenzie*, 28 September 1896, Eagle Rock, Barry County; Greene County; *Dewart*, 3 June 1892, Potosi; *Eggert*, 5 June 1892, St. Francois County; *J. W. B.*, 19 May 1881, Willard; *Trelease*, 13 October 1897, St. Francois County; *Bush*, 20 July 1891, and 12 October 1893, Shannon County. ARKANSAS: *Glatfelter*, 17 July 1898, Eureka Springs.

INDEX TO AMERICAN BOTANICAL LITERATURE

(1905)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omission their kindness will be appreciated.

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